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Light Rail Planner's Guide

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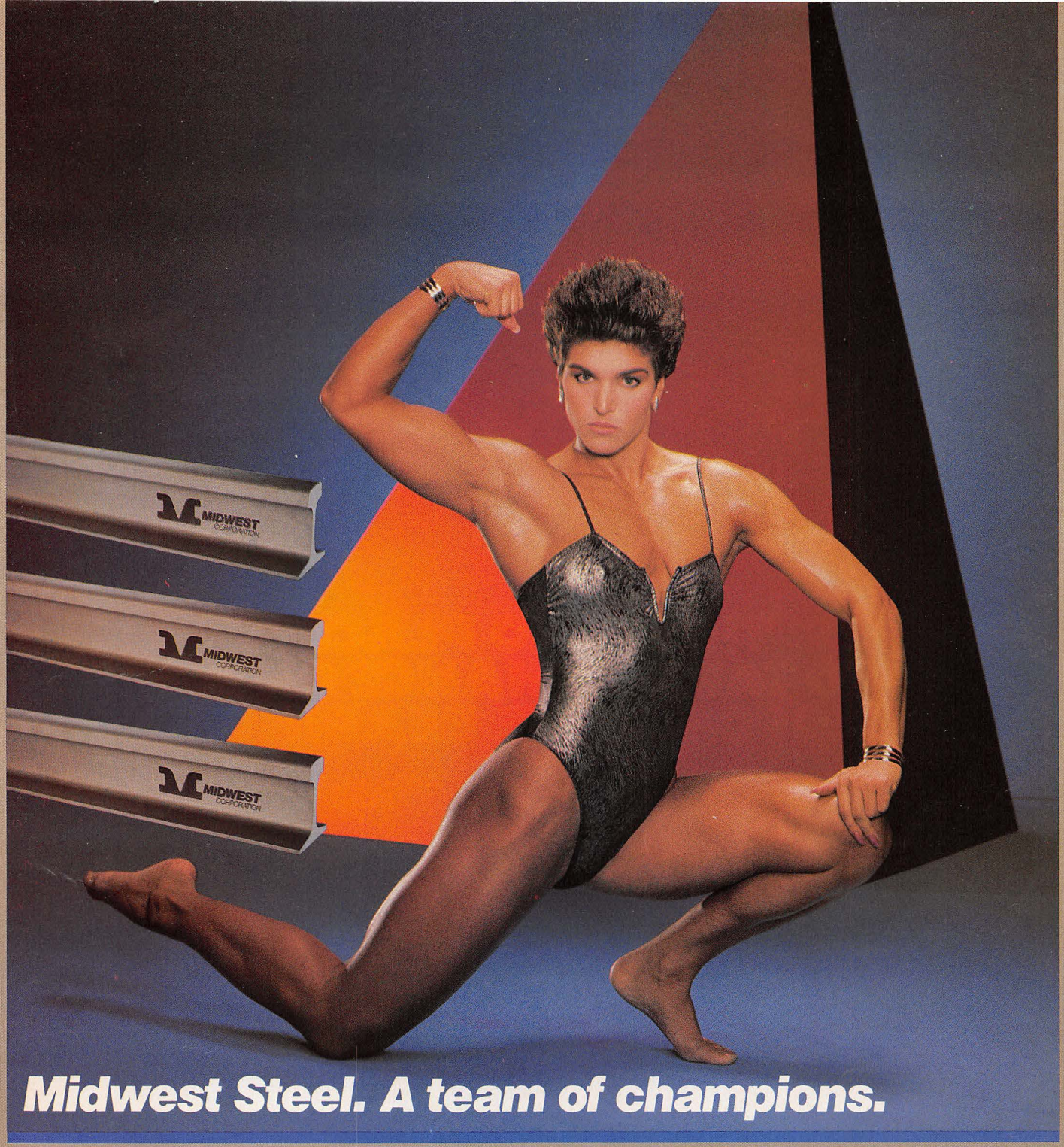

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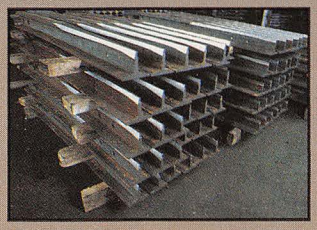

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Features

LIGHT RAIL PLANNER'S GUIDE

Transit's viable alternative LR3

How planners can profit from the experience of cities that have already taken the light rail route is the subject of a probing essay by William D. Middleton.

Who's who in light rail transit LR14

A directory of consultants, suppliers, and other companies that stand ready to help planners bring light rail from concept to reality.

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Florida East Coast's freight-only Jacksonville-Miami line will be equipped with an automatic train control system being devised by FEC and its equipment supplier, Harmon.

31 Locomotives: The rebuild option

Rebuilt motive power—including a large number of switchers originally built at Erie—is coming out of GE's Cleveland shop in "good as original" condition.

39 Rail lubrication: What comes next?

As railroads race to reap the fuel-saving benefits of locomotive wheel-flange lubrication, some questions remain unanswered. What, for example, is the optimum grease?

44 For CSX, a signal achievement

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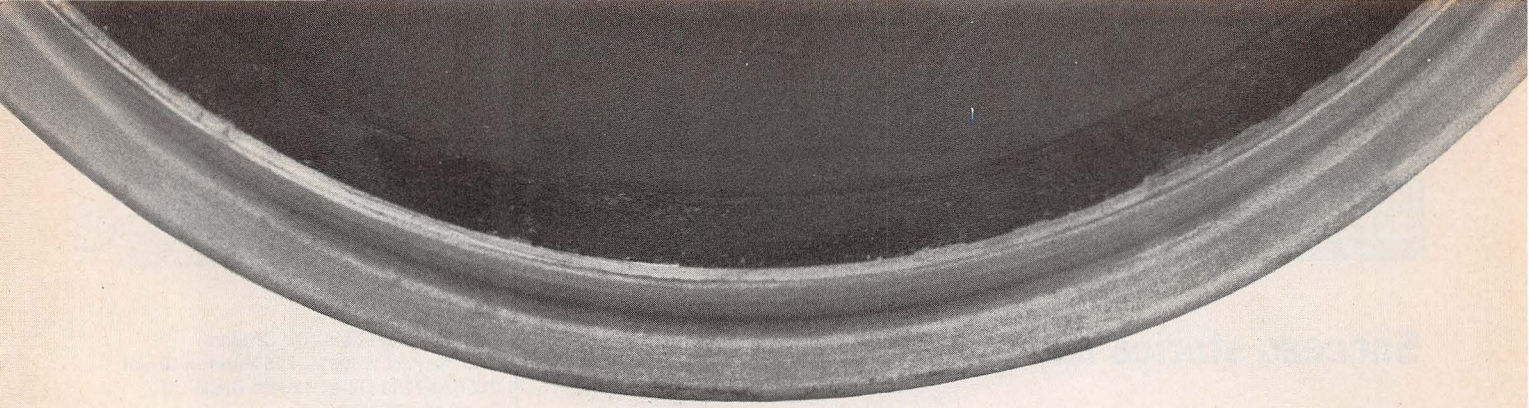

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Inside

Success stories and cautionary tales

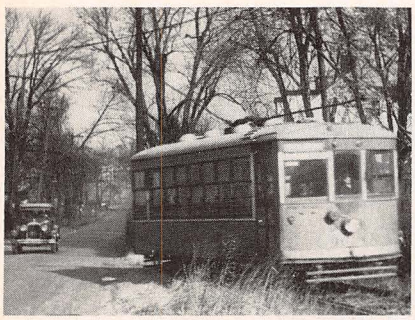
LUTHER S. MILLER

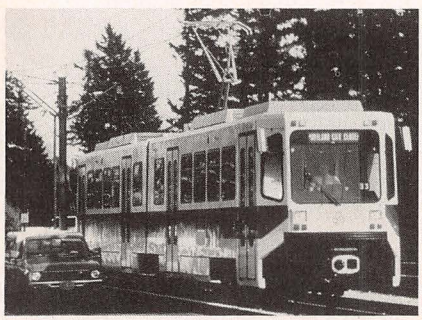
The light rail transit field abounds with success stories. Perhaps the most familiar is that which in recent years has unfolded in San Diego—and, in fact, is still being written as San Diego's LRT system continues to expand. For high return on a low investment, the San Diego Trolley stands out as a beacon to light rail planners around the world. Everybody—especially everybody in San Diego—loves the San Diego Trolley.

And then there is San Jose. Nobody—especially nobody in San Jose and environs—seems to be completely happy with the 6.5 mile light rail segment that opened there late in 1987. "San Jose trolley may be folly," proclaimed the *Oakland Tribune* in a story ticking off some of the woes confronting the Santa Clara County line—flawed planning, inflated ridership estimates, alleged shady practices on the part of a major contractor. (It should be remembered that a similarly bad press greeted the opening a few years ago of Buffalo's Light Rail Rapid Transit System—a system that is now widely acknowledged by transportation experts to be a solid success.)

Can other cities—cities that are just beginning to consider the light rail option; or even cities that are already well advanced in the planning stage—learn from the experience of those that have already taken, for better or for worse, the light rail route?

We believe that they can, and with this in mind we began putting together the Light Rail Planner's Guide that occupies much of this issue. We asked Contributing Editor William D. Middleton, this country's preeminent writer on light rail, to look at the best practices that have been followed at home and abroad and to draw whatever conclusions he thought might be useful to neophyte planners. Meanwhile, Publisher Charles Ellwanger and consultant B.R. Chaffin compiled a directory of those companies that supply light rail consulting, engineering and other services, as well as hardware. The results of their efforts—plus the messages of companies that supported this enterprise with their advertising—appear in the 50-page pullout section that immediately follows p. 27 in our regular pagination.





SAME GAME, NEW NAME: The rail vehicle pictured on the left was called a streetcar when it was photographed by *Railway Age* Publishing Director Robert G. Lewis 50 years ago between Media and Folsom, suburbs to the south of Philadelphia. It's a single-truck Birney car. The more recent-vintage railcar on the right, supplied to Portland, Ore., by Bombardier, is called a light rail vehicle.

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Editorial and Executive Offices
New York, N.Y. 10014, 345 Hudson Street
212/620-7200 (Telex 425421 SIMB UI)
Fax: 212-633-1165

CHARLES H. ELLWANGER, Publisher
LUTHER S. MILLER, Editor

Publishing Director: Robert G. Lewis

Associate Editor: Anne Hirs
Contributing Editor: William D. Middleton
Art Director: Maurice H. Mates
Graphics Director: Diana Line
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Vice President-Marketing: Arthur J. McGinnis, Jr.
Sales/Publisher's Assistant: Tina Small
Production and Contract Manager: Carmen Enriquez
Circulation Fulfillment Manager: Marie Faranda

Western Editorial Offices
Chicago, Ill. 60604,
175 W. Jackson Boulevard, Suite A-1927
312/427-2729
Fax: 312-427-3014

GUS WELTY, Senior Editor
Intermodal Editor: Bill Fahrenwald
Engineering Editor: William J. Semioli
Contributing Editor: F.K. Plous
Editorial Assistant: Wanda Welty

Washington Office
Silver Spring, Md. 20901, 10214 Southmoor Dr.
301/593-2924

Associate Editor: John H. Armstrong

International Offices
Falmouth, Cornwall, TR11 4RJ, England
P.O. Box 8 (Telex: 45320 IRJFAL G)
Telephone: 44-326-313945
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International Editors: Michael Knutton, David Briginshaw

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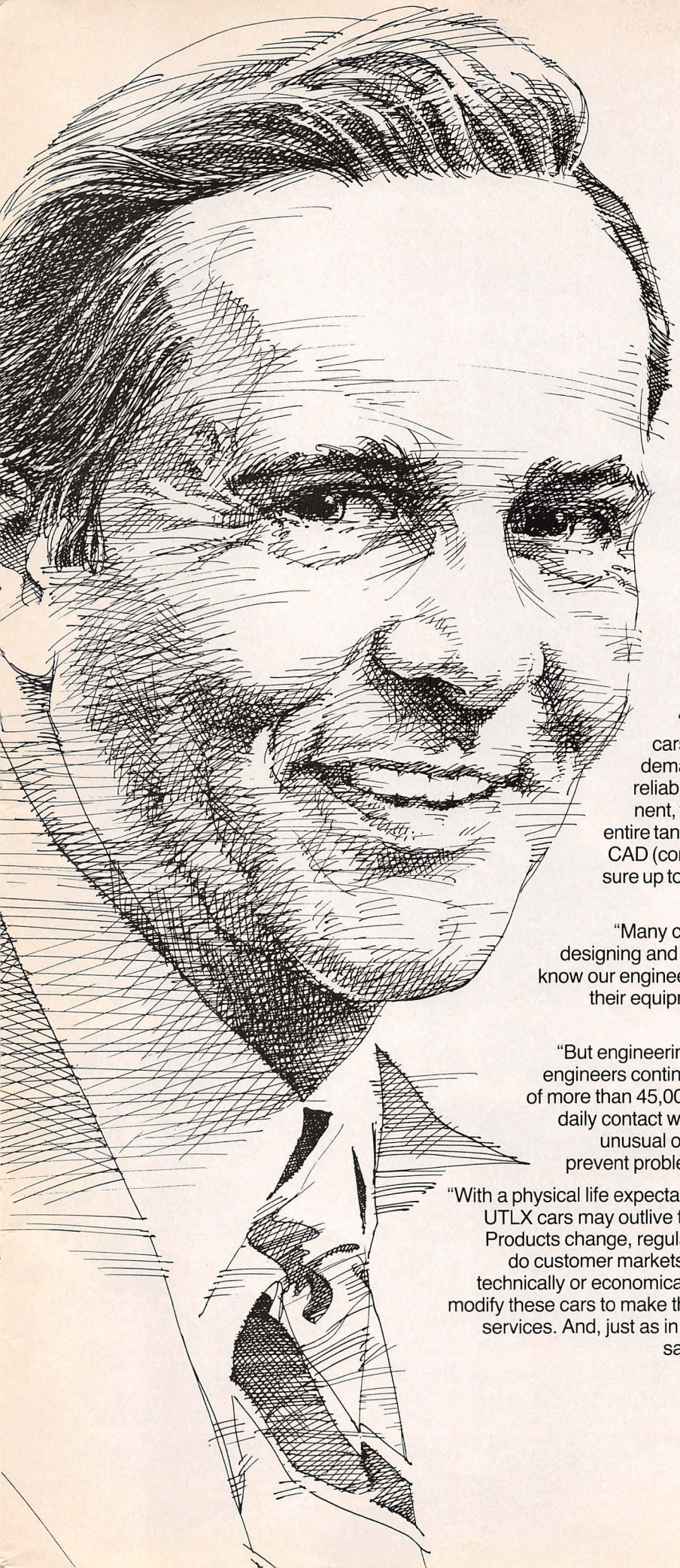

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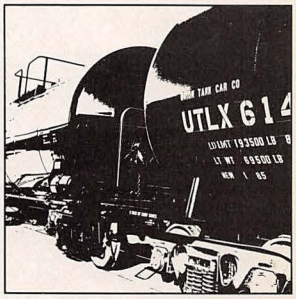

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Market Outlook

Equipment

Bombardier: Will become the majority shareholder in the Belgian company, Constructions Ferroviaires et Metalliques BN, with acquisition of the 30% interest currently held by the Societe General de Belgique. Bombardier acquired 45% of BN's capital stock in 1986. BN is a leading European manufacturer of rolling stock.

Trailer Train: Ordered 500 Impack intermodal platforms from Bethlehem Steel's Freight Car Division for delivery in this year's second quarter. Delivery of an earlier order for 500 Impack platforms will be completed by Bethlehem in the first quarter. The Impack is a patented design of Itel Rail Corp. The platforms are joined in five-unit segments to haul trailers ranging in length from 28 to 48 feet.

Facilities

PATH: Awarded a $6.7-million contract to the Bellezza Co., Inc., South Kearny, N.J., for construction of a new electrical substation in Jersey City. In a separate project, PATH will purchase two ventilation fan units for the Exchange Place station in Jersey City from TLT-Babcock, Inc., of Akron, Ohio, for $1,050,000.

Los Angeles County Transportation Commission: Awarded a $3.6-million contract to Harris Corp. for a supervisory control and data acquisition system for the 21.2-mile light rail line LACTC is building between downtown Los Angeles and Long Beach. The M9200 system will incorporate two Harris H800 computers and include four dual-monitor workstations, three single-monitor workstations, a rear projection statusboard, and 24 remote terminal units. Advanced software applications will include data base management, network communications, man-machine interface, report generation, train tracking and identification, and gate monitoring.

New York City Transit Authority: Awarded a $177-million contract to Perini/Tutor-Saliba/Buckley, a joint venture, for rehabilitation of the Lexington-4th Avenue line between Borough Hall station, Brooklyn, and 161st Street station in the Bronx. Work is to begin immediately and is to be completed by June 1991.

Revenue freight carloadings

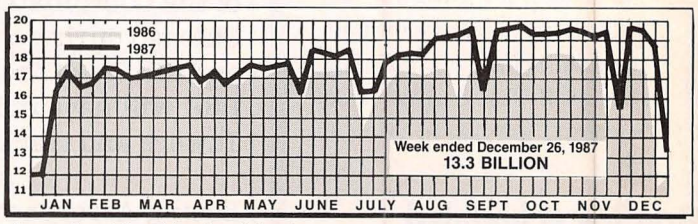
Commodity	1987 52 weeks	1986 52 weeks	% change
Grain	1,505,206	1,268,347	18.7
Other farm products	203,375	192,667	5.6
Metallic ores	846,153	797,839	6.1
Coal	5,810,862	5,725,272	1.5
Crushed stone, gravel and sand	745,962	678,154	10.0
Nonmetallic minerals	489,677	475,503	3.0
Grain mill products	565,386	546,314	3.5
Food and kindred products	567,210	562,984	0.8
Primary forest products	543,681	535,041	1.6
Lumber and wood products except furniture	418,740	396,990	5.5
Pulp, paper and allied products	646,724	654,785	(1.2)
Chemicals and allied products	1,369,714	1,273,042	7.6
Petroleum products	249,500	240,649	3.7
Stone, clay and glass products	539,234	510,415	5.6
Coke	260,174	218,357	19.2
Metals and products	472,378	414,616	13.9
Motor vehicles and equipment	980,383	1,037,611	(5.8)
Waste and scrap materials	451,843	412,775	9.5
Forwarder and shipper assn. traffic	142,842	197,853	(38.5)
All other carloads	3,997,665	3,627,914	10.2
LCL traffic	4,849	6,023	(24.2)
Total Cars Loaded	**20,811,558**	**19,783,151**	
% change from previous year	5.2	1.9	
Estimated revenue ton-miles (billions)	941.3	874.5	
% change from previous year	7.6	(0.3)	

Piggyback loadings

	1987 52 weeks	1986 52 weeks	1985 52 weeks
Trailers/containers	5,155,737	5,006,157	4,590,952
% change from previous year	3.0	9.0	0.6

Rail freight traffic trends

Billion ton-miles (Estimated)



Source: Association of American Railroads

Freight cars

	DELIVERED 4th quarter 1987	DELIVERED 4th quarter 1986	ORDERED 4th quarter 1987	ORDERED 4th quarter 1986	ON ORDER AND UNDELIVERED January 1 1988	ON ORDER AND UNDELIVERED January 1 1987
Built new by carbuilders	3,552	3,972	5,077	2,985	6,736	2,677
Rebuilt	27	20	27	20	0	0
TOTAL	**3,579**	**3,992**	**5,104**	**3,005**	**6,736**	**2,677**
Locomotives (new and rebuilt)	75	56	N/A	N/A	35	3

Source: Transportation Div., AAR and American Railway Car Institute

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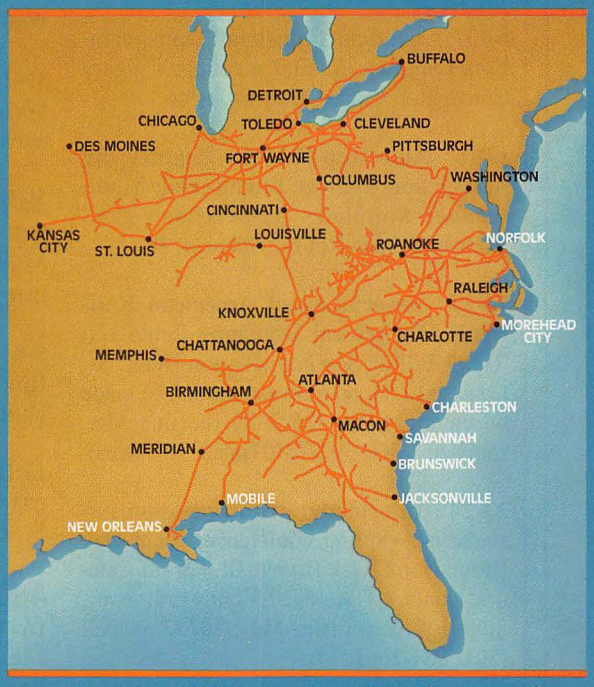

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Meetings

FEBRUARY

15-17 National Railroad Intermodal Association—Meeting; Marriott Westshore Hotel, 1001 North Westshore, Tampa, Fla., 33607.

MARCH

8-10 Canadian Industrial Transportation League—Annual meeting; Calgary Convention Center, Calgary, Alta.

13-16 American Railway Engineering Association/Railway Engineering-Maintenance Suppliers Association—Conference; Palmer House, Chicago, Ill.

22-23 Association of American Railroads Mechanical Division—Tenth Car Repair Billing Seminar; Clarion Hotel, St. Louis, Mo. Hotel reservations can be made by calling 1-800-325-7353 (outside Missouri) or 1-800-392-7310 (inside Missouri).

23-24 Intermodal Transportation Association—Spring conference; Hyatt Oak Brook Hotel, Oak Brook, Ill. For information contact ITA, 6410 Kenilworth Ave., Suite 108, Riverdale, Md., 20737, or call (301) 864-2661.

APRIL

19-21 Georgia Freight Bureau—Fifth Annual International Intermodal Expo; World Congress Center, Atlanta. For information: Nat Welch, (404) 524-7777, or Doug Smith, (404) 352-2452.

MAY

10-12 National Association of Rail Shippers—Annual seminar; Minneapolis, Minn. For information, call Martha McManus Kappel, (202) 639-2378.

11-13 Women's Transportation Seminar—Annual meeting; Marriott Hotel, Minneapolis.

24-27 Canadian Transportation Research Forum—Annual conference, with the theme, "Transportation Research in Changing Environments"; Minaki Lodge, Minaki, Ont. For information: Andrew Elliott, (306) 933-8687.

25-28 Railroad Public Relations Association—Meeting; Mariner's Inn, Hilton Head, S.C.

27-31 National Association of Railway Business Women—Annual meeting; Hyatt Regency, Fort Worth, Tex.

31-June 2 High Speed Rail Association—Fifth International Convention on High Speed Rail; L'Enfant Plaza Hotel, Washington, D.C.

31-June 4 International Society of Weighing and Measurement—Conference; New Orleans Hilton.

JUNE

1-5 Canadian Railway and Transit Manufacturers Association—Annual meeting, Quebec City.

5-9 American Public Transit Association—Rail transit conference; Buffalo Hyatt, Buffalo, N.Y.

13-15 American Association of Railroad Superintendents—Annual meeting, St. Louis, Mo.

AUGUST

16-18 Operation Lifesaver, Inc.—National symposium, Virginia Beach Resort and Conference Center, Virginia Beach, Va.

22-24 Association of American Railroads Communication and Signal Division; Railway Systems Suppliers, Inc.—Annual meeting and exhibit; Washington Hilton, Washington, D.C.

SEPTEMBER

19-22 Coordinated Associations/Railway Supply Association—Annual technical conference, Chicago Hilton and Towers; RSA exhibits, Chicago Hilton and Towers (indoor) and 12th St. at S. Michigan Ave. (outdoor).

18-21 American Bridge & Building Association, Roadmasters and Maintenance of Way Association of America, Railway Engineering-Maintenance Suppliers Association, Inc.—Annual meetings; Palmer House, Chicago, Ill.

OCTOBER

2-6 American Public Transit Association—Annual meeting; Queen Elizabeth Hotel, Montreal, Quebec.

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INTERNATIONAL RAILWAY JOURNAL

IRJ

and RAPID TRANSIT REVIEW

Industry Outlook

Winona Bridge Railway sets March start-up

Winona Bridge Railway, the wholly owned Burlington Northern Railroad subsidiary set up to handle new intermodal business across the northern tier, now plans to begin operations in March, using trackage rights over BN's northern line in the Seattle-St. Paul-Winona, Minn., corridor. This is the only principal corridor on which BN has not been able to reach agreement with its operating unions for operation of Expediter-type trains, new business trains which run with two-person crews and without cabooses. Negotiations with the United Transportation Union have been continuing, but in the meantime, WBR is headed for a start-up with the intention of being a low-cost carrier that can attract traffic not now moving on BN. President of WBR is Stephen C. Nieman, who has been in charge of BN's intermodal business unit.

Steady rise forecast in freight-car orders

Slowly but surely, the freight-car manufacturng industry is regaining its strength. The American Railway Car Institute is now estimating 1988 car orders at 19,900 and deliveries at 17,300. For 1989, estimates are for 24,100 cars ordered and 21,000 delivered. Actual figures for 1987 were 17,518 cars ordered and 13,386 delivered (both figures including 150 rebuilds). ARCI members see increasing strength in five car types—covered hoppers, articulated and non-articulated flatcars, steel open-top hopper cars, and tank cars. Fourteen ARCI member companies, including five carbuilders, participated in compiling the 1988-89 estimates, which were announced last month.

RSA schedules RAILEXPO '88

It's a "Go" for RAILEXPO '88. The Railway Supply Association will hold the exhibit, its first since 1984, Sept. 19-22, 1988, in Chicago in conjunction with the annual technical conference of the Coordinated Railroad Mechanical Associations. Also in Chicago during the same week will be the annual meeting and dinner of the Railway Progress Institute. As in 1984, RSA will have indoor exhibits at the Chicago Hilton and Towers and track exhibits at a nearby location.

Briefing scheduled on missile-train plan

Boeing Aerospace, which has won the system design contract for the Pentagon's missile-train project (RA, Sept. 1987, p. 19), will brief prospective railway suppliers at the Ramada Hotel O'Hare, Rosemont, Ill., Feb. 17. A 45-minute presentation by Jerry D. Crum, engineering manager of the project for Boeing Aerospace, will be followed by a question and answer period. The session has been arranged by the Railway Progress Institute. A contract for the missile-train cars is to be awarded this spring. By 1993, the Pentagon hopes to have a fleet of 25 MX missile trains ready for duty in its Peacekeeper Rail Garrison.

Market Outlook

Equipment

Bombardier: Will become the majority shareholder in the Belgian company, Constructions Ferroviaires et Metalliques BN, with acquisition of the 30% interest currently held by the Societe General de Belgique. Bombardier acquired 45% of BN's capital stock in 1986. BN is a leading European manufacturer of rolling stock.

Trailer Train: Ordered 500 Impack intermodal platforms from Bethlehem Steel's Freight Car Division for delivery in this year's second quarter. Delivery of an earlier order for 500 Impack platforms will be completed by Bethlehem in the first quarter. The Impack is a patented design of Itel Rail Corp. The platforms are joined in five-unit segments to haul trailers ranging in length from 28 to 48 feet.

Facilities

PATH: Awarded a $6.7-million contract to the Bellezza Co., Inc., South Kearny, N.J., for construction of a new electrical substation in Jersey City. In a separate project, PATH will purchase two ventilation fan units for the Exchange Place station in Jersey City from TLT-Babcock, Inc., of Akron, Ohio, for $1,050,000.

Los Angeles County Transportation Commission: Awarded a $3.6-million contract to Harris Corp. for a supervisory control and data acquisition system for the 21.2-mile light rail line LACTC is building between downtown Los Angeles and Long Beach. The M9200 system will incorporate two Harris H800 computers and include four dual-monitor workstations, three single-monitor workstations, a rear projection statusboard, and 24 remote terminal units. Advanced software applications will include data base management, network communications, man-machine interface, report generation, train tracking and identification, and gate monitoring.

New York City Transit Authority: Awarded a $177-million contract to Perini/Tutor-Saliba/Buckley, a joint venture, for rehabilitation of the Lexington-4th Avenue line between Borough Hall station, Brooklyn, and 161st Street station in the Bronx. Work is to begin immediately and is to be completed by June 1991.

Revenue freight carloadings

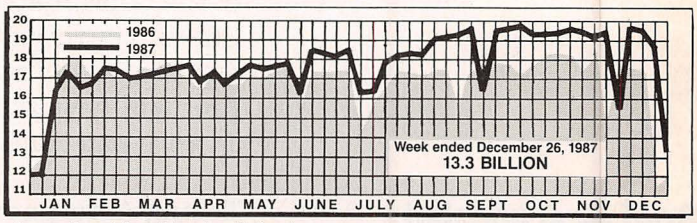
Commodity	1987 52 weeks	1986 52 weeks	% change
Grain	1,505,206	1,268,347	18.7
Other farm products	203,375	192,667	5.6
Metallic ores	846,153	797,839	6.1
Coal	5,810,862	5,725,272	1.5
Crushed stone, gravel and sand	745,962	678,154	10.0
Nonmetallic minerals	489,677	475,503	3.0
Grain mill products	565,386	546,314	3.5
Food and kindred products	567,210	562,984	0.8
Primary forest products	543,681	535,041	1.6
Lumber and wood products except furniture	418,740	396,990	5.5
Pulp, paper and allied products	646,724	654,785	(1.2)
Chemicals and allied products	1,369,714	1,273,042	7.6
Petroleum products	249,500	240,649	3.7
Stone, clay and glass products	539,234	510,415	5.6
Coke	260,174	218,357	19.2
Metals and products	472,378	414,616	13.9
Motor vehicles and equipment	980,383	1,037,611	(5.8)
Waste and scrap materials	451,843	412,775	9.5
Forwarder and shipper assn. traffic	142,842	197,853	(38.5)
All other carloads	3,997,665	3,627,914	10.2
LCL traffic	4,849	6,023	(24.2)
Total Cars Loaded	**20,811,558**	**19,783,151**	
% change from previous year	5.2	1.9	
Estimated revenue ton-miles (billions)	941.3	874.5	
% change from previous year	7.6	(0.3)	

Piggyback loadings

	1987 52 weeks	1986 52 weeks	1985 52 weeks
Trailers/containers	5,155,737	5,006,157	4,590,952
% change from previous year	3.0	9.0	0.6

Rail freight traffic trends

Billion ton-miles (Estimated)



Source: Association of American Railroads

Freight cars

	DELIVERED 4th quarter 1987	DELIVERED 4th quarter 1986	ORDERED 4th quarter 1987	ORDERED 4th quarter 1986	ON ORDER AND UNDELIVERED January 1 1988	ON ORDER AND UNDELIVERED January 1 1987
Built new by carbuilders	3,552	3,972	5,077	2,985	6,736	2,677
Rebuilt	27	20	27	20	0	0
TOTAL	**3,579**	**3,992**	**5,104**	**3,005**	**6,736**	**2,677**
Locomotives (new and rebuilt)	75	56	N/A	N/A	35	3

Source: Transportation Div., AAR and American Railway Car Institute

Watching Washington

Make-work marches on, behind the banner of safety

Year after year, session after session, Congress has found a certain popularity to be gained by concerning itself with matters of railroad "safety," matters which have often been more concerned with make-work than with safety. Most times, common sense prevails and the worst provisions are weeded out—most times, but not always.

In the 100th Congress, similar bills passed both House and Senate, with the differences to be straightened out after Congress got back to work late last month. Railroads were understandably on edge, because once again, make-work was parading behind a "safety" banner.

The tendency was there again, as one industry spokesman put it, to "emphasize the unnecessary and ignore the necessary."

One action that would have a significant impact on safety would be a strengthening of the Federal Railroad Administration's authority in the area of drug and alcohol testing. But Congress hasn't been all that interested in that kind of action.

Instead, House and Senate have again demonstrated an interest in micro-management, in getting subject-specific and even hardware-specific with respect to alleged problems. In some areas, high-cost provisions lacking any proof of effectiveness were written into the legislation with no hearings, no testimony, no record whatsoever. In some areas, H.R. 3743 and S. 1539 simply fly off into space, forgetting or ignoring the fact that the Department of Transportation since 1970 has had broad regulatory powers regarding railroad safety, and forgetting or ignoring the fact that the Federal Railroad Administration has far more expertise than Congress in determining what is and is not needed in order to improve safety.

No hearings, no testimony, no record? How about the provision in the House bill requiring DOT to order the installation of fencing around rail yards in densely-populated areas. That one, and several others, came up for the first time during mark-up. Railroads had no opportunity to show proof that fencing is ineffective and impractical, that it would cost a not-small fortune with small benefit to anybody except the sellers and installers of fencing. (An estimate described as "very conservative" puts the cost of installation alone at more than $630 million, without considering maintenance or repair or replacement costs and assuming that "densely-populated" means cities of 100,000 population or more.)

Forgetting or ignoring DOT's 1970 safety mandate? Forgetting or ignoring FRA's greater-than-Congressional expertise? How about provisions in one bill or the other that deal in specific areas in sometimes-vague terms concerning signal inspections, installation of event-recorders on locomotives, the licensing of locomotive engineers, the "harassment" of employees or (hang on) the improvement of rail safety around college campuses.

It almost seems as if the lawmakers sat around a table and somebody would say "How about this?" and somebody else would say "Hey, that sounds good, write it in," even though the subject had not come up before—no hearings, no testimony, no record, no nothing.

And yes, it's hard to argue against "safety," even against that which has little relationship to the real ways in which safety is enhanced. Safety, railroads and DOT-FRA know, has a lot to do with training and education and enforcement of sensible rules and regulations. Safety is being improved in these ways, and in the installation of new hardware where that makes sense.

Safety could be further improved with tougher rules on drug and alcohol testing, with random testing. But neither the House bill nor the Senate bill provides for that. No, random testing in the rail industry appears only as an amendment made in the Senate to another House bill—dealing with, of all things, the protection of airline passengers. That legislation too is headed for conference committee. Keep watching.

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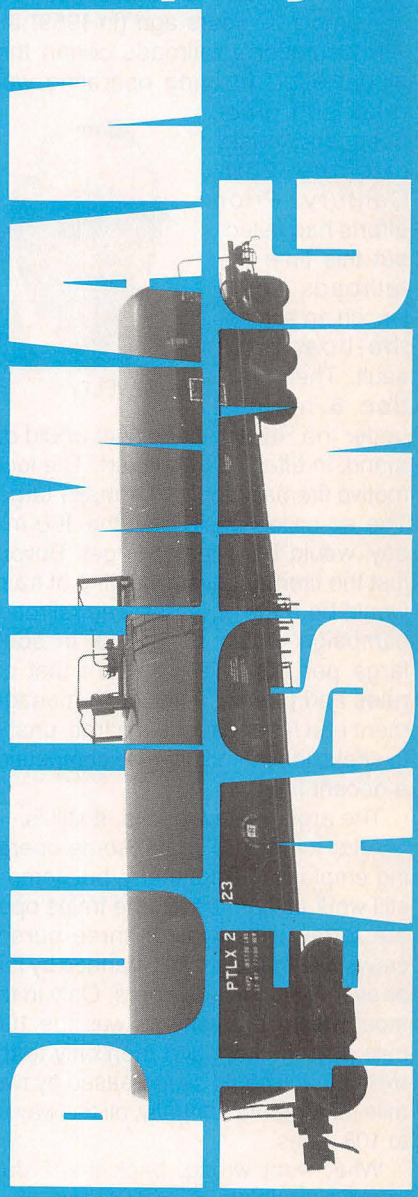

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How the FEC made work-rule reforms work

It may be hard to believe, but it was almost 30 years ago (in 1959) that the nation's railroads began their all-out effort to bring operating work rules and practices and costs into the 20th Century. Prior efforts had failed, but this time the railroads would launch an across-the-board assault. Their Section 6 notices under the Railway Labor Act would demand, in effect, a fresh start. The locomotive fireman would be a major target. The so-called basic day, the 100-mile day, would be a major target. Beyond just the fireman, over-manning of trains would be a major target. The railroads' campaign would be based, in some large part, on the argument that old rules and practices had both management and labor caught in a trap, unable to shake loose and give the competition a decent fight.

GUS WELTY

The argument was valid. It still is.

After almost 30 years, some operating employees—not many, but some—still work as firemen. Some trains operate today with two- or three-person crews, but many are still manned by four or even five crew members. Only in the most recent agreements was the 100-mile day cracked, and then only to the extent that it could be increased by two-mile increments annually, all the way up to 108 miles.

What went wrong, back then? Just about everything.

Railroad employees didn't much like being portrayed as featherbedders. The five operating unions didn't much like each other, but the railroad campaign made true brothers of them. Well before the days of LBJ, government's attitude was "Let us reason together," and as might be expected that led to one delay after another, with all three branches of the federal government getting involved and with the whole sorry affair dragging on from one Administration to another to another.

Someday, two books should be written.

The *other* one would deal with Florida East Coast.

FEC. Back in '59, FEC was just one of a whole bunch of Class 1 railroads, and not a very significant one at that. By some measures, it's still not all that significant. Among today's 18 Class 1 carriers, based on 1986 numbers, it came in dead last in terms of miles of road operated, and it was 16th in revenue ton-miles and operating revenues. But FEC was 8th in net railway operating income, and it was 6th in ordinary income. FEC.

FEC began *its* labor-reform program a few years after the industry as a whole began its, and for a then-new FEC team the goal would truly be across-the-board reform, not just in the operating area but among the non-ops as well.

FEC was struck, of course. But it did the then-unthinkable: It stayed in business, operating. FEC took everything that rail labor could throw at it, in the legal sense. It also took a fair amount in the illegal sense, sabotage, vandalism, that sort of thing, from individuals who opted to work outside the law.

FEC prevailed. It operates with two-person crews. It runs its trains without cabooses. It has lower labor costs, a lower labor-cost ratio than any other Class 1 carrier. It also, now, provides the kind of employment stability that rail unions keep demanding: FEC's average employment in 1986 was slightly higher than it was in 1976, and what other Class 1 can say that? FEC has invested in the property. Few visitors would come away, probably, without agreeing with what one top Federal Railroad Administration official has to say about FEC: "They run a first-class operation."

The man in charge of that operation, as president, is R. W. Wyckoff—the same Ray Wyckoff who was on the point in the labor-relations sense in the '60s when FEC's course was set. And yes, FEC today does have a union, the Florida Federation of Railroad Employees, representing all crafts; FEC negotiates with the FFRE under the Railway Labor Act just as other railroads negotiate with their dozen-or-more unions.

The union, Wyckoff says, doesn't get everything it wants—but neither does the railway. Further, he says—and if you know Ray Wyckoff, you believe—fair treatment of people is a rule to live by: "More than one supervisor has bit the dust because he thought he could run roughshod over people." FEC takes a no-nonsense approach to rule violations (very much including Rule G), but if an employee thinks he hasn't received a fair shake, he can make an appointment and put his case before the president, so far as most issues are concerned.

Clearly, FEC has made it all work. It stood alone, in the '60s, and it made it work—which gives rise to the obvious question, as to the railroads that are now trying to go it alone. Guilford, for example, is in a confrontational mode. CSX is working with high-level employee representatives on gain-sharing possibilities. Burlington Northern has been talking about wide-ranging proposals for change with its employee representatives.

The late '80s are not the early '60s, obviously.

For the most part, there is today a new generation of rail management and a new generation of rail union leaders. There is certainly a new "generation" of transportation competition.

Unfortunately, many of the management-labor problems of the '60s remain as the problems of the '80s. Some of them, perhaps most of them, are not likely to go away soon, and that observation has largely to do with the institutional problems of rail labor, including the multiplicity of organizations and both the external and the internal politics of a labor organization. Management, in contrast, seems to have its house (or houses) in somewhat better order. And yes, indeed it might be better for all concerned if the Railway Labor Act were scrubbed, but that's not likely to happen—even though, at age 62, the RLA ought to be able to retire.

What is, is—and you live with it, even as you keep trying to change it, even as you hope change can come before it's too late to matter.

Letters

"B" as in Blair

Columbus, Ohio

To the Editor:

I was both delighted and dismayed to read Mr. Robert G. Lewis's editorial in "Perspective" (*RA*, Dec. 1987, p. 64). I was delighted to see the recognition which Mr. Lewis has given to railroad electrification and the benefits which it can offer rail transportation systems. I was dismayed to find that Mr. Lewis has taken the liberty of changing my first name to Bernard....

While Mr. Lewis asks how railroad boards of directors can be expected to ask shareholders to invest in projects whose return is five to ten years down the road, I might point out that many investor-owned utility boards continue to ask their shareholders to invest in generation and other system improvement projects whose return is in the five- to ten-year time frame.

Blair A. Ross
Vice President,
Energy Resources Planning
American Electric Power Service Corp.

Life after debt?

Atlanta, Ga.

To the Editor:

Your article, "Regional railroads: Is there life after debt?" (RA, Nov. 1987, p. 42) was quite factual on the regional railroad issue, especially concerning management and finances.

Even considering improvements in service and marketing, regionals must still interline the bulk of their traffic with larger carriers. Lack of quality connecting services only serves to undermine improvements the regional makes. The regionals and major carriers must jointly recognize the traffic potential of low-density lines and its sensitivity to service levels.

Although regionals fill a void in low-density markets, it's questionable whether the issue of removing excess capacity and retention of redundant facilities is being addressed in certain markets, where consolidation and traffic rights might prove more appropriate. Survival of regionals goes beyond rehabilitation and traffic buildup; equally important is vigilance to prevent matriculation to a high cost structure and revenue adequacy through interlining. The focus must be on evolving the national rail system into a quality-oriented and service responsive product to compete effectively. Regionals can't be viewed in isolation.

Charles B. Jones, Jr.
President
Shasta Corp.

Reducing wheel wear

London, England

To the Editor:

The "Permaspray" technique (*RA*, July, 1987, p. 49) may have applications additional to the relining of engine cylinders.

One possibility would be the treatment of wheel flanges by the Permaspray process. The wear resistance of the metal/P.T.F.E. matrix would reduce wear, whilst the self-lubricating property of the compound would reduce rolling resistance. Unlike conventional flange lubrication, there would be no risk of lubricant getting onto the top of the rail. The absence of "wet" lubricant would also eliminate problems caused by adverse weather or airborne dust.

C.Mathes

25 eventful years

New York, N.Y.

To the Editor:

Thank you very much for the splendid article about PATH (*RA*, Sept., 1987, p. 71). The title, "PATH-25 going on 80," well summed up our efforts to rehabilitate the long-lived Hudson & Manhattan Railroad.

These have certainly been 25 very eventful years for PATH following H&M acquisition. And *Railway Age* has been working closely with us for much of the way.

Richard R. Kelly
Vice President and General Manager
Port-Authority Trans-Hudson Corp.

Integral trains and other fallacies

Oak Park, Ill.

To the Editor:

As a now self-employed former operating and mechanical officer of first the Missouri Pacific and later the Rock Island, let me play Devil's Advocate and express my unhappiness with the article by John Armstrong on integral trains (*RA*, Sept., 1987, p. 43).

You are well aware of the many "solutions" to railroad ailments offered since the end of World War II. If only steam were replaced with diesels, passenger trains were eliminated, weak railroads were merged into strong ones, etc., etc., the industry's ailments would disappear forever. Well, none of the "perfect solutions" have worked or will work since they fail to allow the railroad industry to regain market share and regain the most desirable traffic.

In fact, I left the MP and moved to the RI precisely because I wanted to address these very issues. Under Dr. Paul Banner's guidance the CRI&P in the mid-1970s was attempting to re-enter the short haul and gathering service markets through innovative labor agreements and "truck-type" shipper responsive services provided by trains instead of trucks. After all, if the largest transportation markets are value and time sensitive merchandise and shorter haul markets, the railroad industry's continued obsession with long and long haul trains will guarantee that the rail industry's market share will continue to shrink. It appears most or all current integral train ideas are simply the present-day version of long haul, long train thinking.

While the reasons for continuing this type of long haul, long train, integral train thinking are complex, I contend a basic reason is the historical failure to understand the industry's cost structure. Rigidly regulate the rail industry, force each train no matter of what length or service to carry a six man crew, and change that crew every 100 miles regardless of time in service, and what traffic is profitable? Why, only traffic that can cover such overhead by moving long distances in long train sized lots.

However, once crew size constraints and rigid crew districts are eliminated (as Dr. Banner and the CRI&P were trying to do) "trains" of any length, any crew size, and any mileage can become profitable. One car, ten car trains, and one or two man crews can be used . . .

The challenge thus is to revise the structural cost constraints, not to continue to build equipment that fits the long haul thinking of a prior era. I contend, as Devil's Advocate, that integral train thinking falls into this latter arena.

John Baskin Harper,
President, J. B. Harper, Inc.

Update

Employment still declining

Class I railroad payrolls continue to shrink. The Interstate Commerce Commission's latest count, for mid-November 1987, shows Class I railroad employment at 241,115, down 9.29% from November 1986 and down 3.36% from October 1987.

By employee group, these were the November 1987 totals (with declines from a year ago in parentheses): Executives, officials and staff assistants, 12,071 (6.87%); professional and administrative, 42,125 (12.95%); maintenance of way and structures, 48,530 (11.72%); maintenance of equipment and stores, 45,639 (7.33%); transportation other than train and engine, 15,482 (10.58%); transportation, train and engine, 77,268 (6.82%).

This EMD unit was modified at San Bernardino.

Cabs disappear in Santa Fe rebuilds

Santa Fe Railway's San Bernardino, Calif., shops are turning out eight cabless locomotive units, rebuilt from 3,600-hp units that have seen between two million and three million miles of service since they were turned out by General Motors' Electro-Motive Division in 1972-74. The cabless units have been modified with installation of roof hatches for quicker, easier access to the 20-cylinder engine and for cooler operation of the dynamic braking system. Each of the locomotives is also going through a complete electrical rewiring and remanufacturing process. Santa Fe shops had built two cabless units in 1983 on an experimental basis.

BN moves toward "one-stop shipping"

Burlington Northern is aiming to strengthen its position in global transportation with formation of a subsidiary, Burlington Northern Worldwide, which will offer customers the opportunity to ship internationally on a single bill of lading.

According to Murry W. Watson, president of BNW, the new subsidiary "will develop an inland U.S. infrastructure, combined with NVOCC and foreign inland infrastructures. We will be an independent subsidiary of Burlington Northern Railroad, which will continue to market its rail services to international customers. BN Worldwide will provide its clients a network of transportation and distribution services for ltl, lcl, full containerload and dry bulk cargo."

Ralph Muellner, vice president-marketing and sales of BN's International Department, says the new unit "will package rail, truck and ocean services into an integrated intermodal network. The BN International Department will continue to market BN rail services to its customers as before."

In an interview with *Railway Age* last year (*RA*, Oct. 1987, p. 39) BN President and Chief Executive Officer Darius W. Gaskins, Jr., outlined his railroad's approach to the one-stop transportation concept: "We've tried to build partnerships with the other participants in the transportation market. Sometimes we hold ourselves out as the basic provider and we have subcontractors who help get the job done. Sometimes another party is the basic provider and he subcontracts with us for the rail portion of the haul.

"We think that it's very important that we participate in the provision of one-stop transportation, but we don't feel that we have to own all parts of the process."

There are niches out there, Gaskins said, "where people are crying for one-stop shipping, and we're hoping to be able to step into some of those niches."

BN Worldwide, which began operations Jan. 1 from a headquarters at Irving, Tex., will also have offices in New York, Chicago, Houston, Los Angeles and Seattle.

NS hikes spending for equipment

Norfolk Southern plans to invest $623.4 million in railroad capital improvements in 1988, up from $521.4 million in 1987. Capital outlays for equipment will rise to $154.2 million from 1987's $94.9 million; spending for roadway and other improvements is budgeted at $469.2 million, compared with $426.5 million last year. Norfolk Southern plans additional capital expenditures of $64.2 million this year for North American Van Lines, up from $41.5 million in 1988.

"We have to increase our car program to meet increased traffic demands," Norfolk Southern Chairman and CEO Arnold B. McKinnon told financial analysts in New York Jan. 27. The car part of the equipment budget will be increased by $27 million, including an $8 million increase for new cars. The budget for locomotives will be increased by $5 million. The spending increase for trailers and other intermodal equipment will amount to $17 million.

Norfolk Southern reported net income of $173.7 million for the fourth quarter of 1987, a record for a full quarter; but income for the year, which included a $620.4 million special charge in the third quarter, was $172.4 million, down from $518.7 million in 1986. Excluding the special charge, 1987 net income would have been $524.2 million, a 1% increase over 1986.

The fourth quarter operating ratio was 76%, down from 83.8% in 1986, McKinnon told the analysts.

APC expands stack-train service

American President Companies' expansion of double-stack international and domestic container service continues, with service now in place to and from St. Louis and Kansas City. Eastbound, APC has scheduled two departures weekly from Los Angeles; four westbound departures weekly are scheduled from both St. Louis and Kansas City for Los Angeles, with service also to Salt Lake City and Oakland.

APC now has more than 140 stack train departures scheduled each week, with 14 cities in the network.

D&RGW/SP: ICC pledges fast ruling

With Kansas City Southern Industries vowing to fight Santa Fe Southern Pacific's sale of Southern Pacific Transportation to Denver & Rio Grande Western and with at least one of SFSP's two largest stockholders opposed to the move, the Interstate Commerce Commission would appear to be facing another rip-snorter when it begins its consideration of the proposal.

So, it came as a surprise when the ICC—which could take as long as 31 months to make its decision—indicated that it would make a ruling six months after D&RGW makes its filing. In its first go-round involving SPT—on the proposed merger of Santa Fe Railway and SPT—the Commission went almost up to its time limit before vetoing the consolidation, and it later refused to reopen the proceeding even though SFSP had reached agreement with major railroads that had opposed the original plan.

Meanwhile, SFSP continued with its restructuring in other areas. Thus far, it has completed the sale of its general building contractor unit, and it has sale agreements covering Santa Fe Pacific Timber Co., Bankers Leasing and Financial Corp. and the Gulf Central and Chaparral pipeline systems. In connection with the slimming-down, SFSP also planned to cut corporate staff from about 370 to about 125; some of those cut from the corporate level were expected to be transferred to remaining subsidiary companies.

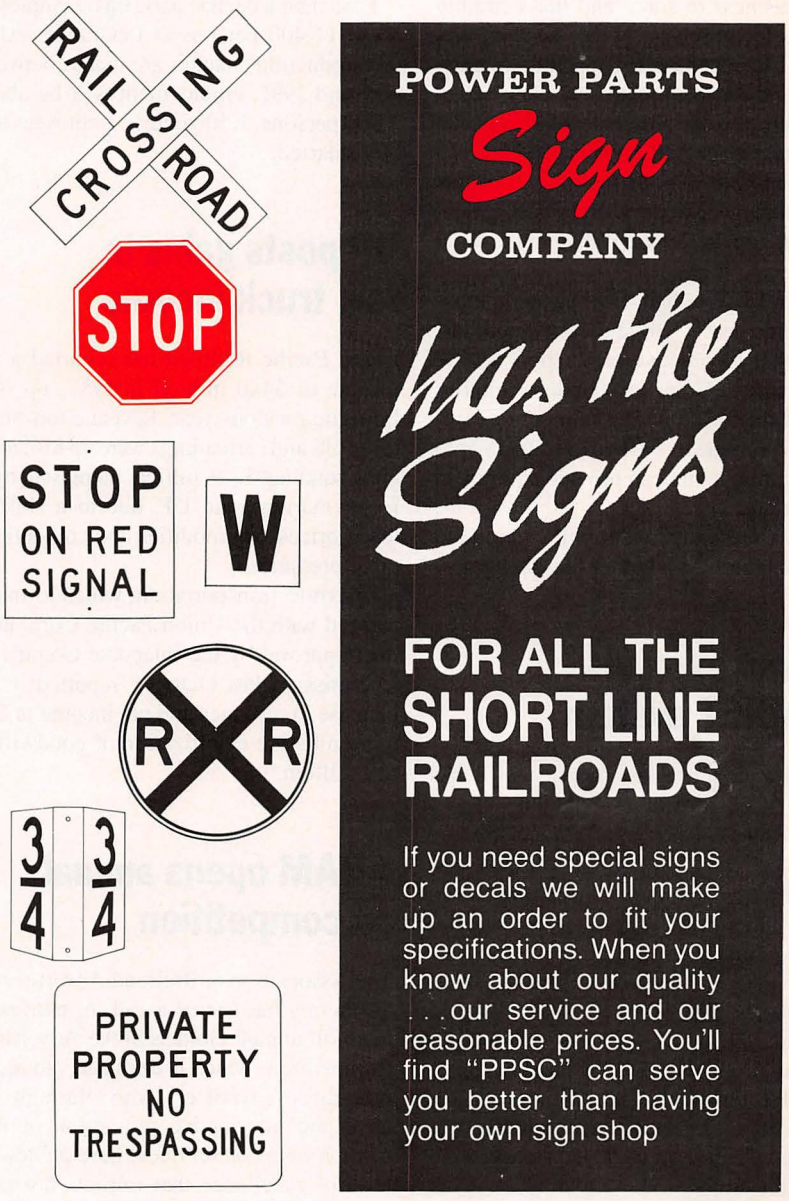
Hauling waste: A growth industry

Railroads and truckers can expect rising demand for hauling municipal solid waste, says Dean Wise, a principal of Temple, Barker & Sloane, a consulting firm that has been studying waste disposal for both private and public sector clients.

Wise notes that several counties in New Jersey have announced plans for using rail/highway vehicles for hauling their waste to landfills in western Pennsylvania. And railroads, he notes, are continuing to evaluate both traditional carload and intermodal technologies for the movement of solid waste.

"Such actions may signal a new growth opportunity for long-haul transportation companies," says Wise. "As time passes, communities could become more inclined to view long-haul transportation as a viable short-term solution to their waste disposal problems."

He acknowledges that hauling waste over long distances may be costly, but says that "it may in fact be an economical trade-off when compared with costly local alternatives, such as building a new landfill or resource recovery facilities."



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Update

Electro-Motive cutting back at LaGrange

Last April, Roger B. Smith, chairman and chief executive officer of General Motors, declared that GM's Electro-Motive Division was here to stay. GM, he said, "plans to be a long-term supplier of motive power," as a company that's in the transportation business to stay "and that certainly includes locomotives." GM, he said, was proud of its record in the locomotive business, "and we're going to play a key role in any future revolutions, or evolutions, that might take place" (RA, May 1987, p. 17).

Roger Smith did not say that all of this would take place in the U.S., at LaGrange, Ill., and it now appears that much of it won't.

Clifford J. Vaughan, EMD general manager since last October, confirmed last month that locomotive production will be moved from LaGrange to London, Ontario, and that manufacture of a number of locomotive components will go to Canada or to other suppliers that can provide equipment at lower cost.

EMD's LaGrange plant will continue to build locomotive and other diesel engines, and it will maintain locomotive manufacturing capabilities. LaGrange will also be EMD's parts warehouse for domestic and export markets, as well as the division's administrative and engineering headquarters.

Less than a decade ago, EMD employed about 14,400 persons at LaGrange. After the production changes are made, between now and 1991, employment will be about 2,300 persons, 1,500 hourly employees and 800 salaried.

Conrail expands SteelNET system

Conrail announced last month that it has added three terminals—at Gary, Ind.; Grand Rapids, Mich.; and Philadelphia—to its SteelNET rail-truck distribution system. The new terminals have climate-controlled indoor facilities to meet special storage requirements for high quality sheet steel, as do five other terminals in the SteelNET system. The other climate-controlled terminals are at Detroit (two), Chicago, Cleveland, and Jackson, Mich. Five other SteelNET terminals—at Baltimore, Chicago, Detroit, Leetsdale, Pa., and Sharon, Pa.—offer unheated enclosed storage and/or outside storage.

Conrail says its SteelNET program offers iron and steel shippers "lower distribution/inventory costs by combining the long-haul efficiencies of rail transportation with the flexibility of truck delivery." The railroad estimates that the total cost for its rail-truck service can be as much as 20% less than rates for long-haul trucking.

UP posts gains in rail, truck income

Union Pacific Railroad has reported a net income of $440 million in 1987, up 14% from the previous year. Revenue ton-miles rose 16% and carloadings were up 8%; revenues totaling $3.9 billion increased by a lesser margin, said UP, due to a shift to lower-priced commodities and competitive price pressures.

Overnite Transportation, which formally merged with the Union Pacific Corp. after final approval by the Interstate Commerce Commission last October, reported a 3% increase in revenues and net income of $43 million before amortization of goodwill of $19 million.

ARAM opens annual ad competition

The Association of Railroad Advertising & Marketing has issued a call for entries for the 37th annual Golden Spike Advertising Competition, which is designed "to recognize those advertisers who, through creative and informative promotion of their own products or services, have achieved a level of excellence that impacts favorably upon the railroad and railroad supply industries in the United States and Canada."

Further information is available from, and entries should be submitted to, Reid Kenedy, c/o W. D. Woodburn, director of creative services, Santa Fe Southern Pacific, 224 South Michigan Ave., Chicago, Ill. 60604. Deadline for entries is March 31.

1987 grain traffic at record high

Railroads moved a record 5.1 billion bushels of grain in 1987, topping the previous high of 5 billion bushels set in 1980. In 1986, the railroads hauled 4.3 billion bushels of grain.

According to the Association of American Railroads, the weekly average for rail grain traffic in 1987 was 98.2 million bushels, compared with 96.2 million in 1980 and 82.6 million bushels in 1986.

The traffic surge was fueled by grain exports, which climbed to 3.9 billion bushels in 1987 from 3 billion in 1986. The record for grain exports, 4.92 billion bushels, was set in 1981.

If U.S. Department of Agriculture forecasts are on target, export grain traffic will continue strong in 1988.

Most grain now moves in jumbo covered hopper cars, and as of Jan. 1 there were 236,393 of these in the U.S. fleet. "Although the record 1987 grain movement caused some spot shortages of cars," said the AAR, "fast turnarounds at export elevators and expeditious handling by railroads to return cars to grain elevators prevented more widespread shortages."

However, continued strong movements of grain doubtless will lead to additional car purchases. Union Pacific, for example, is reported to be contemplating acquisition of up to 2,000 additional grain cars over the next two years.

Durox expands production facilities

The Durox Co., which supplies custom molded rubber sealing to the railroad and transit industries, is tripling its production capacity with inauguration of a new, 10,000-square-foot rubber molding plant at Strongsville, Ohio.

"Our ability to custom design and mold sophisticated high-tech parts, using exotic compounds which resist aggressive temperature and chemical stress, will be enhanced dramatically," said Robert C. Smykall, president of Durox.

William Matthews will supervise operations of the new plant at Strongsville as well as existing facilities at Rittman, Ohio.

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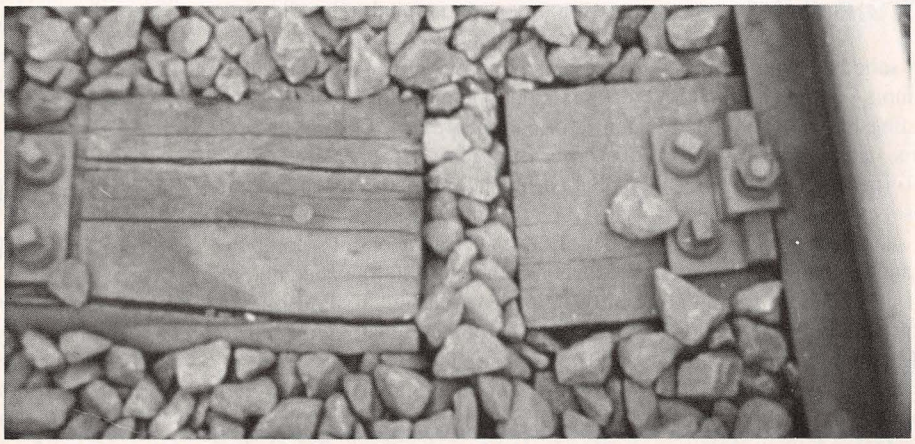

Oak tie (left) and Azobe tie (right), installed in France in 1957.

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Update

Intermodal business soars on Santa Fe

For the railroad industry as a whole, intermodal traffic growth in 1987 was not all that great—but for Santa Fe, it was. Final numbers were expected to show that Santa Fe had handled close to 800,000 trailers and containers last year, "a record total...well above that of any preceding year," according to President John Swartz.

Through mid-November, Santa Fe showed a 15% gain in trailers and a 12% increase in containers, with trailers accounting for about 70% of total intermodal business.

Swartz noted the benefits of deregulation: "We would have found it difficult to compete successfully and achieve this growth if intermodal traffic were still regulated." He also credited marketing and sales efforts aimed at getting time-sensitive traffic off the highways, better schedules and improved service, creation of the Quality Service Network for short-haul corridor business, and increased double-stack container traffic.

Meanwhile, Santa Fe was also opening two new off-line, full-service intermodal terminals, at Cleveland and Sacramento. Three such Intermodal Market Xtension terminals were opened earlier, at Cincinnati, Columbus and Indianapolis, to serve off-line customers.

CC&P and GEC reach debt accord

Troubled Chicago, Central & Pacific and its primary creditor, General Electric Credit Corp., have reached an agreement in principle for restructuring of CC&P's loan. That agreement, the railroad said, will provide the "time and flexibility to attain the level of operating profitability it needs to fulfill its debt obligations and to re-invest in the business."

Under the plan, GECC continues as the primary creditor. A majority interest in the company will be owned by a management group which includes Chairman and Chief Executive Officer Donald R. Wood; a subsidiary of Midwest Energy continues as a minority owner.

Trimmed-down ICG withdraws from AAR

IC Industries is on schedule with its proposed spinoff of Illinois Central Gulf to ICI shareholders. A ruling has been obtained regarding the tax-free nature of the transaction, issues involving ICG preference shares have been resolved, and it's expected that a registration statement will be filed with the Securities and Exchange Commission in February. If all continues to go on schedule, the spinoff should be completed before mid-year. Meanwhile, ICG—still the 10th largest U.S. railroad, even after trimming down from 8,000 miles to about 3,000 miles—has decided to withdraw from the Association of American Railroads, although it will continue to participate in such areas as TRAIN and UMLER. When all AAR-related costs are figured, ICG says it expects to make savings of close to $1.5 million a year.

TeleTrak handles shipper queries fast

TeleTrak, Conrail's direct-dial shipment-tracing service, is now handling about 1,200 customer inquiries a day, but it's far from overworked. The computerized tracing system is programmed to handle up to 8,000 inquiries daily.

"By allowing our customers to dial directly into our computer for car or van location information, we save Conrail and our customers a lot of time," says G.M. Williams, Jr., the railroad's vice president-sales.

On an average day, Conrail's computer keeps tabs on about 65,000 loaded and recently unloaded railcars. To find out the status of a shipment, customers dial an "800" number. The TeleTrak voice-response system then guides callers with easy-to-follow instructions. If the caller wishes to trace a shipment, TeleTrak—using a person's voice speaking pre-recorded phrases and numbers—provides instructions on how to enter the car or van number of the shipment. The computer then checks the number entered and the programmed recorded voice responds with the status.

Marine-equipment ID: The RITE way

After three years of testing, the Cargo Handling Cooperative Program has reached agreement on a standard for automatic marine-equipment identification "and is actively pursuing the development of a worldwide standard." CHCP is an organization made up of U.S.-flag ocean-transportation companies, including American President Lines, Sea-Land and Matson, and the U.S. Maritime Administration.

The CHCP standard, Radio Frequency Identification of Transportation Equipment, or RITE, makes use of proven RF technology to identify equipment such as containers, chassis and motor-generator sets in marine or intermodal terminals. The system uses a tag which can be read through an antenna for relay of identification and other data into a computer.

According to Nancy Friedman of Advanced Technology, Inc., who has been coordinating the standardization effort for CHCP, sufficient technology has been developed for carriers to implement RITE programs now. And, says CHCP, "carriers are now convinced of its benefits and are carefully assessing implementation plans."

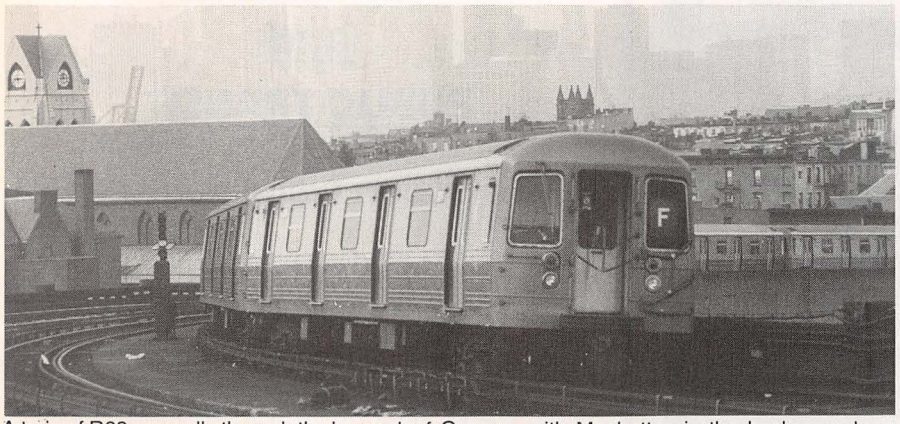
CHCP hoped to complete its standards work by the end of 1987. In cooperation with the American National Standards Institute, the Automatic Identification Equipment Manufacturers and representatives of other transportation modes, CHCP will next move toward establishment of a national standard and then an international standard.

Beijing to host logistics parley

A first announcement and call for papers has been issued by the Eighth International Logistics Conference, which will be held April 25-27, 1989 in Beijing, China.

Coincident with the Congress will be an International Logistics Machinery Exhibition. Among the sponsors of the Congress is the PRC's Ministry of Railways; the China Railway Society is listed among supporting organizations. The address of the Secretariat for the Congress is 25 North Yuetan Street, Beijing, China.

Transit Update



A train of R68 cars rolls through the borough of Queens, with Manhattan in the background.

NYCTA receives 105th R68 subway car

Delivery of the 105th R68 subway car, manufactured by Westinghouse-Amrail, to the New York City Transit Authority was celebrated with a ribbon-cutting ceremony at the car assembly plant in the Brooklyn Navy Yard.

The current NYCTA order calls for delivery of 200 cars by mid-1988. By delivering at least 100 cars before Dec. 31, 1987, Westinghouse-Amrail secured substantial savings to the NYCTA under the provisions of the safe harbor leasing arrangement that financed the cars' purchase.

The R68 is New York City's newest subway car, with technical design by the French partners, components from the U.S. and France, and final assembly and testing conducted at the Brooklyn Navy Yard by ANF-NEMKO, another French-American partnership. The quiet, graffiti-proof R68s have been appearing on the IND and BMT lines as part of the Metropolitan Transit Authority's $8.5 billion capital improvement program.

Houston votes for light rail

Houston voters have given their approval to a master transit plan calling for construction of a $1.04-billion, 20-mile light rail line connecting four major employment centers and fed by buses (RA, June 1987, p. 51). The total transit package approved at the polls Jan. 16 will cost $2.57 billion. The turnout was light, representing about 9% of registered voters; the preliminary tally was 57,800 for and 38,000 against.

Five years ago, in a development that stunned local transit officials, voters in Houston rejected a plan for a heavy-rail transit system for which cars had already been ordered. The new plan, unlike the one shot down in 1983, will not saddle the city with additional debt. It calls for 70% financing by a combination of federal grants and private-sector involvement, with the remaining 30% coming from an existing 8% sales tax.

The new plan has widespread support from the business community, which contributed $550,000 for a promotion campaign prior to the Jan. 16 vote. Mayor Kathy Whitmore says the system now proposed will give Houston "high quality public transportation and overall mobility."

LSTS leads team redesigning Jamaica

The Long Island's 75-year-old Jamaica Station will receive over $300 million of improvements to upgrade service and provide additional passenger capacity. Jamaica Station is the nation's busiest, with over 600 passenger and freight trains using or passing through it each day. LS Transit Systems, Inc. leads the team to design the improvements. Jamaica Station will be rebuilt to include additional and extended platforms, a new pedestrian overpass, upgraded signaling, bypass tracks, a new centralized master control tower, modifications to existing bridges and structures, and improved passenger information and communication systems.

DART to break ground on rail network

Dallas Area Rapid Transit expects construction to begin this year on the first starter lines of its 93-mile light rail network. A 6.8-mile rail segment from Illinois Avenue in Oak Cliff to Griffin Street in downtown Dallas, and a 7.7-mile segment from downtown to Park Lane, are scheduled for completion in 1994.

In addition, a 3.6-mile rail segment from the Griffin Street Station downtown to Parkland Hospital has a targeted opening date of 1995. A 1.3-mile rail extension from Illinois Avenue south to Simpson-Stuart Road, and the 6.2-mile West Oak Cliff line are to be completed in 1996. Targeted to open by 1997 is a 3.3-mile segment of the Plano Line from Park Lane to Texas Instruments (north of LBJ Freeway).

Los Angeles awards equipment contracts

The Los Angeles County Transportation Commission last month announced the award of contracts totaling $13.5 million for equipment in connection with the Los Angeles-Long Beach light rail line. The awards went to:

—PAC TEL Infosystems ($6.7 million), for a cable transmission system that will relay all rail related communications through an underground network of fiber optic and copper wiring.

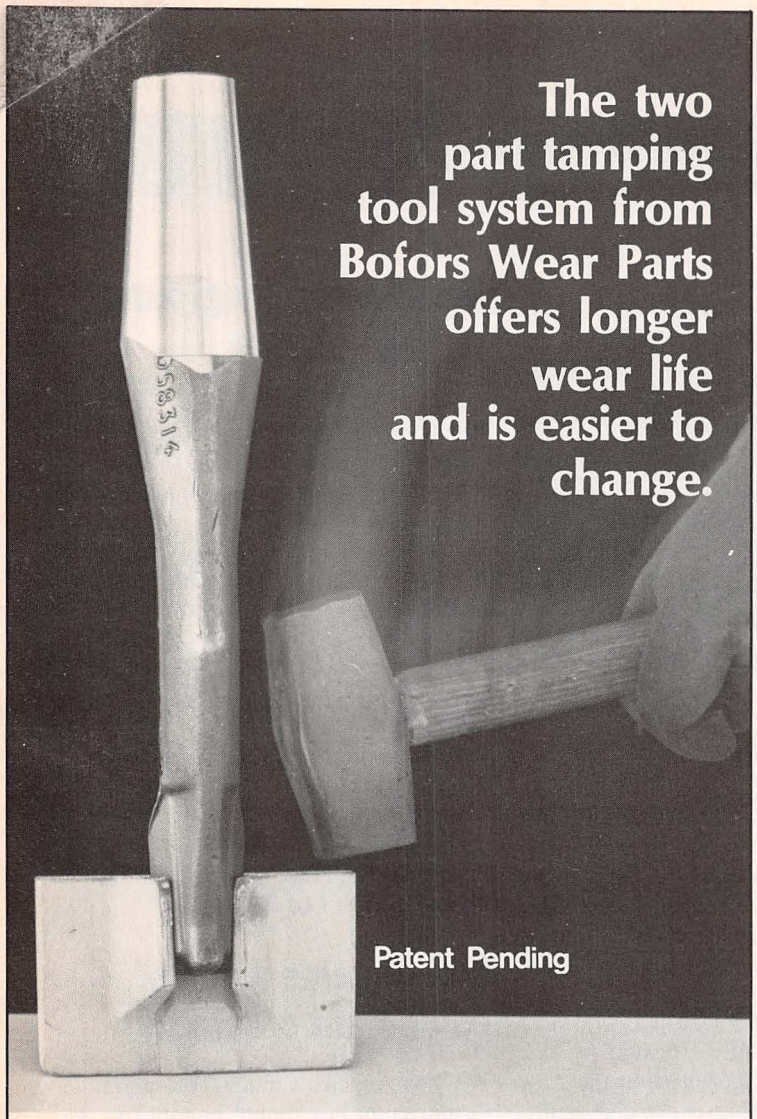
—GFI-General Farebox of Elk Grove, Ill. ($5.6 million), for installation of a fare collection equipment for both the light rail project and the first phase of the Metro Rail system being built in downtown Los Angeles.

—Simmons Machine Tool Corp. of Albany, N.Y. ($778,600) for wheel truing equipment.

—Sherman Supersonic Industries Corp. of Mississauga, Ont. ($457,000), for light rail vehicle wash equipment.

Work on all four contracts began last month and is to be completed by the time the line opens in mid-1990.

The ceremonial laying of the first track for the Los Angeles-Long Beach line took place Jan. 11 at the corner of 28th Street and West American Avenue in Long Beach.



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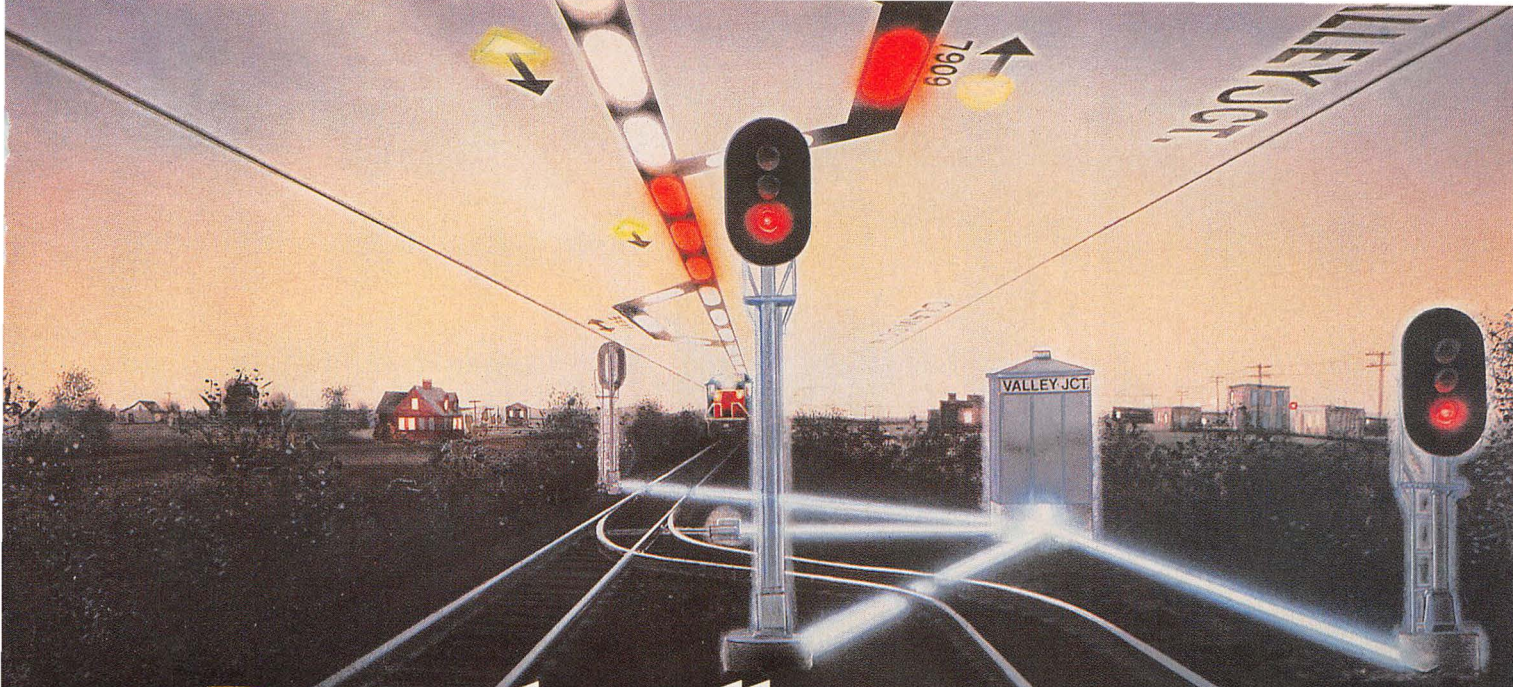

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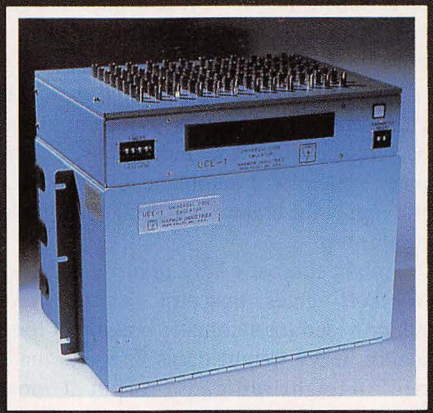

The new microprocessor-controlled Harmon UCE-1 is compatible with most relay code systems, making modernization simple, economical and quick.

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"Always a leader" in installing new types of safety equipment, FEC is now leading the way in automatic train control for freight-only operations, on a

FEC: System-wide with ATC

Florida East Coast and Harmon Industries are devising an automatic train control system to be installed on the entire Jacksonville-Miami main line at a cost of around $6 million.

By GUS WELTY, Senior Editor

Late last year, the Federal Railroad Administration ordered installation of automatic train control (ATC) equipment on all trains running in the Northeast Corridor, where the freight operations of several railroads (mainly Conrail) co-exist with the fast and frequent passenger-train operations of NEC-owner Amtrak.

But by that time, freight-only Florida East Coast had already begun preliminary work that will lead to installation of an ATC system on its Jacksonville-Miami main line.

The job will cost upwards of $6 million.

Completion, FEC now estimates, will take two to three years.

Harmon Industries is supplying the equipment, both on-train and off.

The work FEC began last year had to do with changes in control devices for highway grade-crossing protection signals, and FEC will have a lot of that work to do: In 843 track miles, including branch lines, it has 658 public grade crossings, 611 of them with automatic protection.

Why would FEC be in the lead on ATC?

• **Going its own way.** For one thing, FEC runs a lot of trains on what is essentially a single-track main line. For another, as President R. W. Wyckoff puts it, FEC has "always been a leader" in installing new types of safety equipment.

The idea of ATC, of course, is that if an engineer does not operate his locomotive in accordance with signal indications, a computer system will automatically take control, apply the brakes, and bring the train to a safe stop.

Freight railroads have argued, and Ray Wyckoff agrees, that past systems "have not provided for automatic braking of long and/or heavy freight trains in a safe manner." Freight railroads, to put it most bluntly, feared that if past systems put a long and/or heavy train into emergency, the results might be as bad as, or worse than, if there were no ATC system in place.

Federal officials had proposed ATC for the NEC years ago, only to fall back. It was not until the Conrail-Amtrak accident last year—16 dead—that FRA got serious, ordering tests that looked toward an early-1988 order that all NEC trains be fitted with ATC equipment.

FEC, meanwhile, was going its way, as it so often has.

FEC and Harmon were talking and, while FEC had its legitimate concerns about what the NEC tests would produce, it was ready to move. FEC began making crossing-signal system changes, Ray Wyckoff said, "so that the entire system might be implemented as soon as an approved system can be manufactured and delivered."

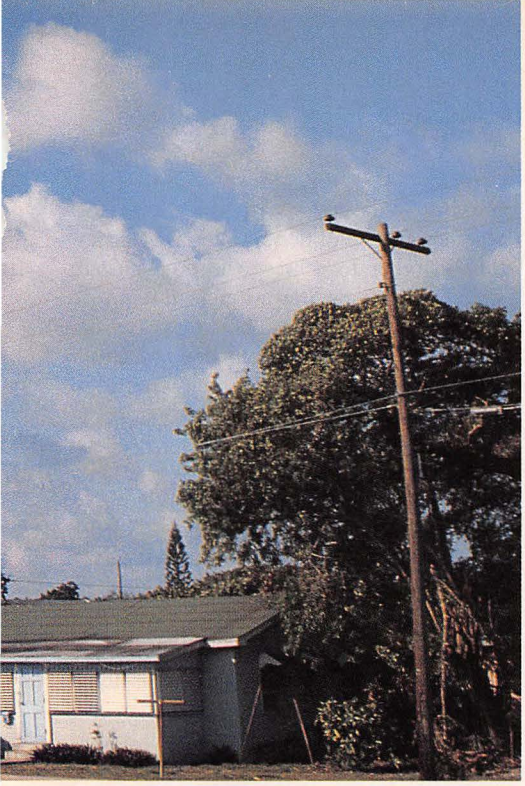
There are varying estimates as to what ATC will cost on the NEC, where three freight railroads operate, Conrail, Providence & Worcester, and Delaware & Hudson. By one guess, more than 700 locomotives might have to be equipped, with the cost running as high as $30 million. And there was the prospect that the ATC mandate might be extended to as many as four corridors that connect with the NEC.

For FEC, the numbers were somewhat simpler. FEC operates 67 road locomotives. It has about 350 miles of road main line track, plus about 100 miles of second main line.

And for FEC, safety really is the first order of business. Its record clearly demonstrates that.

• **A total package from Harmon.** What FEC is getting is a total hardware package from Harmon.

This will include Electro Code 4 microprocessor-based dc-coded track circuitry, Harmon's Phase Motion Detector system for grade-crossing protection (PMD) along



system basis. Kent Patterson

with some Harmon Crossing Processor equipment (HXP), and the manufacturer's Locomotive Speed Limiter (LSL) in its Ultra-Cab 40 design.

Ultra-Cab 40 is a "new, non-conventional concept" that uses a carrier frequency on the rail of 40 Hz rather than the 60 Hz or 100 Hz used in Harmon's Ultra-Cab 60 and Ultra-Cab 100 systems, and it has several advantages for an FEC-type operation. It has a longer range due to lower attenuation in the track, it isn't competing with high levels of on-channel ambient noise, and the frequency is low enough that it causes minimal interference with low-frequency motion-detector equipment used for grade-crossing protection.

Because of the large filters needed to separate the 40 Hz cab current from audio track-circuit frequencies, the 40 Hz current can't be modulated as fast, which produces a slower system-response to changing conditions. That response-time, however, is regarded as "fully compatible with typical freight operations," although it would probably not be appropriate for high-speed and high-density passenger operations with trains running in short blocks on short headways.

• **Unusual requirements.** As it happens, FEC has unusual requirements, one of which is that its block lengths vary from under 8,000 feet to more than 18,000 feet. As design engineers see it, "a speed control system that will enforce a stop with an approach aspect into an 8,000-foot block will waste an unacceptable amount of train time in an 18,000-foot block. Conversely, if the system is designed to enforce a stop at

For Florida East Coast, a most remarkable quarter-century

At Number One Malaga Street, St. Augustine, Fla., "Go for the Gold" has nothing to do with the Olympics. It has a lot to do with the E. H. Harriman Awards for railroad safety performance.

Over the past 19 years, Florida East Coast has come home with the Gold 13 times in safety competition with other railroads in its class. It has four Silver medals and one Bronze to show for the years it did not come in first.

FEC President Ray Wyckoff says the record reflects the road's adoption "of the latest safety devices and the continuous training of employees and enforcement of safety rules and practices."

All that gold in Florida, however, is just one thing that sets FEC apart. Consider some other numbers:

—FEC has 843 track miles, total. Of that, 642 miles are main line, and the main line total includes about 165 miles classified as way and yard switch tracks. FEC has 535.4 track miles of continuous welded rail. FEC has 417 track miles laid with concrete crossties. It's testing turnouts laid with concrete ties.

—In the territory south of West Palm Beach, FEC averages one grade crossing for every 1,200 feet of line. Overall, it has 658 public grade crossings. Of these, 611 have automatic protection devices, including 585 with both gates and flashers.

—FEC believes in owning, not leasing. Its 71 locomotives are owned. So are 2,433 of its 2,741 revenue freight cars. So are 977 of its 991 highway trailers and all of its 181 tractors.

—It will never hit a million units in a year, as Conrail did with intermodal shipments in 1987, but on a percentage basis, FEC leads. Over the past several years, TOFC/COFC has accounted for slightly more than 40% of FEC's carloadings and for almost 30% of its freight revenues. For the first nine months of 1987, it was showing an 18% increase in the number of revenue units handled. Intermodal terminal facilities and equipment would do credit to a much larger railroad. At Miami, FEC has six mechanized loading/unloading devices, with five at Jacksonville, three at Fort Lauderdale and two at West Palm Beach. The Miami facility has ramp trackage for 132 89-foot-equivalent railcars, Jacksonville can handle 120 cars at a time.

—On the financial side, retained earnings have climbed from less than nothing 20 years ago to more than $290 million. Shareholder equity for the corporation, Florida East Coast Industries, Inc., has gone from less than $40 million in the late 1960s to about $350 million. FEC has had no long-term debt since 1982.

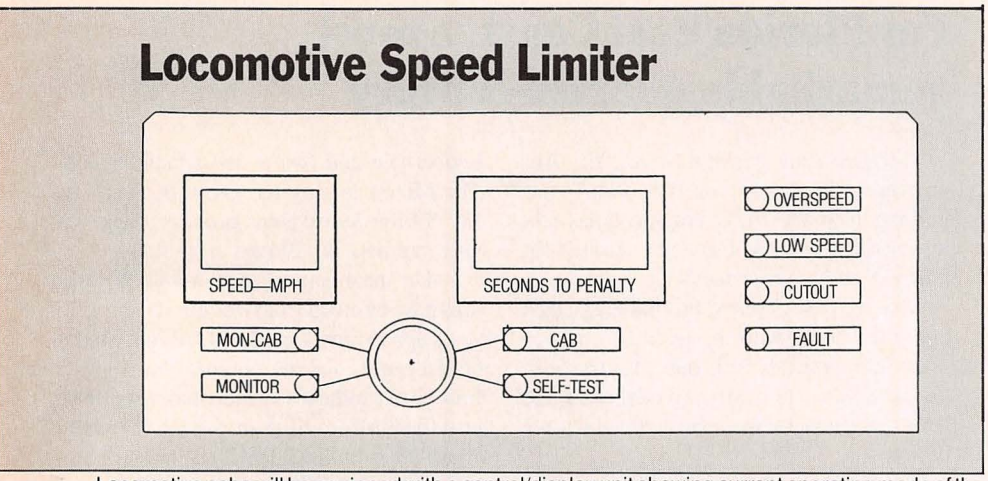
—On the financial side so far as the railway is concerned, payroll, health-and-welfare costs and employee-related taxes accounted for 32% of operating revenues in 1986. Net operating revenue was 25% of total operating revenue.

—Performance ratios? Since the early 1960s, FEC's transportation ratio has been well under the industry average (and its maintenance-of-way-and-structures ratio has been well above). In '86, FEC had an operating ratio of 75.1% and a transportation ratio of 35.1%.

—Since the early '60s, revenue ton-miles have climbed from well under one billion (in 1963) to something approaching 3.5 billion. For the past 20 years, the number of employees has been in a narrow range, ±1,000. On a scale that measures train-miles per day over each mile of road, FEC was below the industry average during the '60s. Now, the industry average is about six. FEC's number is close to 14. FEC has been running more than two dozen through freight trains per day and has had more than a dozen locals working.

Then, there is the FEC general office building in St. Augustine, a truly beautiful building in the Spanish style. From the reception desk, you walk down a short hall to the elevator. You pull the main door open, and then the folding cage door inside, reversing these maneuvers when you get to the floor you want. You walk down the hall then, noticing that there are no numbers and no names on the doors opening off the hall.

You had better know where you're going. But, why not? FEC, clearly, has known where it's going for the past 25 years. And it still does. —G.W.



Locomotive cabs will be equipped with a control/display unit showing current operating mode of the Locomotive Speed Limiter, current actual speed, and time left before penalty brake applications.

18,000 feet or even 15,000 feet, there is no protection provided for the shorter blocks.

"Conventional cab systems use 'code change' points which cause the 'approach' aspect to change to 'restricting' at a point far enough in advance of each signal—typically, 1,000 to 2,000 feet—that a final braking to stop can be enforced."

But, Harmon's engineers say, these code change points add a lot to the cost of wayside equipment "and don't eliminate the problem of significant speed reduction occurring much earlier than necessary in a very long block. Ultra-Cab 40 is designed to operate satisfactorily without utilizing code change points."

In the configuration for FEC, Ultra-Cab 40 will provide for different cab aspects and seven speed-control conditions.

Response time for the system will vary from about two seconds to almost 10 seconds before an aspect change is displayed in the locomotive cab. This is because of the nature of the coded information on the track and the need to read two consecutive identical codes before a change in aspect is accepted. For example, the transition from any other aspect to "restricting" will occur in two seconds or less; the transition from "clear" to "approach" will happen in an average of 5.5 seconds entering a short block and up to about 8.5 seconds entering the longest blocks.

According to Harmon, "a unique feature of Ultra-Cab 40 is its ability to distinguish between passing a permissive stop signal and an absolute stop signal....If conditions change while a train is between signals, this will be recognized by the cab signal decoder and a new appropriate aspect will be displayed," with response times similar to those for transitions that occur at signal locations.

At any time that the cab aspect goes from a less-restrictive to a more-restrictive aspect, in addition to a cab-signal display, an audible alarm will sound. The engineer will be required to press an acknowledge-button within eight seconds after aspect-display. If he does not, the system will take over to bring the train to a stop with a full service brake application.

• **Speed control.** With the Locomotive Speed Limiter, locomotives will be equipped with a small control/display unit in the cab which will show current operating mode of the LSL, current actual speed and time remaining before penalty brake application. That last number will show only during a transition from one cab aspect to another when the transition calls for a reduction in speed.

In general, Harmon says, "speed control is accomplished by monitoring the actual current speed of the locomotive and comparing it to the maximum permitted speed under current circumstances as determined by the cab signal system. If the actual speed is greater than maximum permitted steady-state speed, an alarm sounds and indicators flash on the display unit. If the overspeed exceeds a three-mph 'buffer zone,' a full service brake application will occur, and the brakes cannot be released until the train has stopped. If a transition between two different cab aspects occurs such that a speed reduction is called for, the speed control unit compares the actual speed to a predetermined braking curve that plots speed vs distance traveled. If the actual speed is higher than the final speed called for at the end of the braking curve,the display unit will show the time remaining before penalty braking is applied."

This will give the locomotive engineer an indication as to how soon he must begin braking to comply with the curve, or whether his rate of deceleration is satisfactory in order to achieve the proper final speed. If the deceleration is not rapid enough to fall within the braking curve, an alarm will sound and penalty braking, a full service application, will occur. The train must then stop before braking release.

The Locomotive Speed Limiter itself is packaged into two separate enclosures. One houses the electronics logic unit, the locomotive interface junction box, the setup panel and the internal LSL power supply, and provides access to the diagnostic/maintenance terminal connector. The second enclosure houses the cab display unit, which is under the control of the LSL logic unit.

In normal operation, the cab display indicates the current LSL operation mode and the current speed, established in the system from two independent axle alternators, and when a signal aspect change is detected, the system will notify the engineer if that change results in a warning or calculated overspeed condition.

The display unit panel has a push-button mode switch which allows the engineer to request changes to the current mode. Since the microprocessor is continually monitoring the current operating conditions, designers say, most of the mode changes will be accomplished automatically. Thus, the mode-select push-button will only be used to change from cab to non-cab modes or to request testing or monitoring modes when the locomotive is stopped.

• **New operating rules?** Currently, FEC locomotives are not equipped with cab signals and so some changes in operating rules may be required to cover situations that do not exist with use of wayside signals. Harmon and FEC are anticipating that changes will be needed to cover such things as discrepancies between wayside signals and cab aspect, and train operation outside cab-signal territory. Neither situation is expected to pose a serious problem.

And, neither the supplier nor the railroad sees a problem anywhere, in system application.

A top engineer with Harmon marvels at FEC's fixed plant and, in truth, from the air or on the ground, FEC track looks like a model railroad, with welded rail, concrete crossties, ballast that doesn't have a stone out of place.

For his part, Ray Wyckoff wants to stay out front in safety, as FEC is in other areas. FEC, he says, "is proud to again be in the forefront in providing this latest development in the furtherance of safe rail operations." ■

These "after and before" pictures exemplify what GE is accomplishing with the "Auto Haul" program at its Major Locomotive Rebuild Facility.

Locomotives: The rebuild option

GE's shop at Cleveland is set up to restore locomotives to "good as original" condition. Many of the units that go through the facility are industrial switchers originally built at Erie.

By JOHN H. ARMSTRONG
Associate Editor

In its role as an originator and major supplier of electric propulsion equipment and controls from the days of Edison, Sprague and Thompson, General Electric has supported its transportation products—as well as its line of heavy electrical apparatus for industrial and utility applications across the board—with field engineering and with a network of service shops, currently numbering 70 within the United States.

Four of these GE Apparatus Service shops—New York (North Bergen, N.J.), Philadelphia, St. Louis, and Cleveland—specialize in heavy rail, the first two dealing primarily with transit vehicles. The Railroad Traction Motor Repair Center in St. Louis was recently equipped for the production rebuilding, rewinding, and upgrading of GE 752 and EMD D-77 and D-87 motors on at least as sophisticated and highly automated a basis as any operation in this hotly competitive business. In Cleveland is GE's Major Locomotive Rebuild Facility.

GE estimates that about 6,000 of the industrial switching locomotives its Transportation Systems plant at Erie, Pa., has produced over the past five decades or so are still in service somewhere around the world. With a great many of these in fleets of two or three units, owner "backshop" capabilities tend to be severely limited. Therefore, individualized repair, overhaul, or remanufacture-in-kind are a substantial part of the Cleveland operation, with on-site assistance and repair/return electrical component replacement provided by Cleveland or through the other GE Service Shops. Cleveland also maintains unit-exchange pools of rebuilt industrial-locomotive traction motors and other GE locomotive components.

• Overhaul, remanufacture-in-kind, or modern improvements. Erie still offers new GE switchers, in seven sizes ranging all the way from 25 to 144 tons, that can be expected to operate for a long, long time at higher efficiency and with less maintenance cost than their decades-old counterparts, but at a first cost that many limited-mileage service customers cannot justify with shorter term financing. For many existing industrial swtichers whose declining reliability has made them candidates for a trip through the shop, overhaul of some components, overall remanufacture-in-kind, or an upgrade to incorporate modern improvements—with the choice based on thorough inspection and diagnostic analysis by the Cleveland unit—is likely to be a better bet.

In carrying out the recommended program for a particular industrial locomotive, the Cleveland shop is GE's major facility for rebuilding traction motors, gear units, auxiliaries and alternators or generators to company standards. Diesel engine overhaul or replacement is by Cummins or Caterpillar; new or rebuilt air brake equipment is supplied by the OEM's, though Cleveland is experienced in palletizing brake systems in the interest of improved maintainability.

Many upgrades include applying a new AAR control stand. Cleveland has established itself as a manufacturer of these stands, using only components meeting railroad-service conditions where these exceed many commercial specifications, not only for its own rebuilds but for railroad customers and other rebuilders as well.

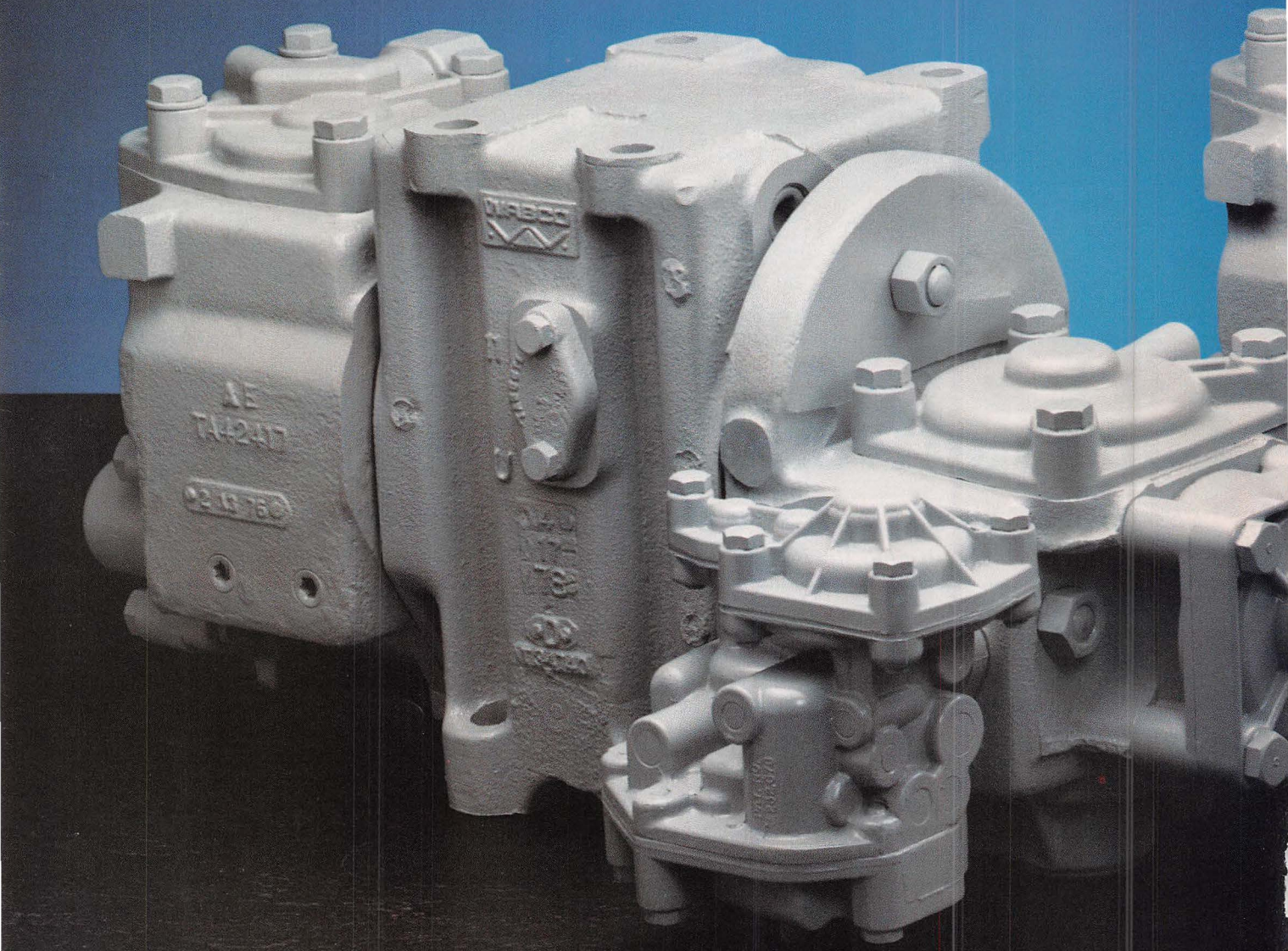
Cleveland also has complete truck re-

No one knows air brakes better than the original manufacturer. Because we are Original Equipment Manufacturers, we are best prepared to service the air brake equipment we make. And you can be sure the same quality, close tolerance parts will be used. We stock large parts inventories so you don't have to, and we shorten your equipment downtime.

WABCO uses factory trained personnel that know our braking equipment inside and out. You can be sure all repairs meet current AAR standards and our own exacting specifications. We also promise a one-year guarantee on all WABCO parts and equipment.

WABCO's five strategic locations were chosen for their relation and importance to the railroad industry. Our Atlanta distribution center also carries a large inventory of repair parts for quick back-up delivery.

For further information, contact your WABCO Representative.



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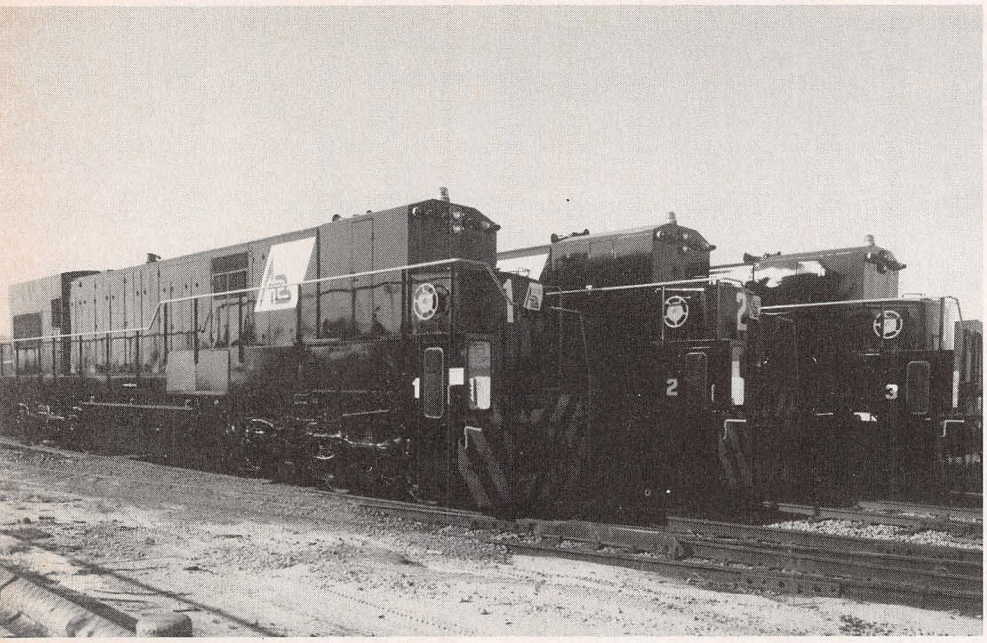


Finished and ready to be shipped to the People's Republic of China are three 1,800-hp Island Creek Coal repowered locomotives.

build capability, including wheel work. A current project is the remanufacture of 400 subway car trucks for the New York City Transit Authority.

• **Rebuilt better-than-new.** Rich Trail, manager of locomotive and traction sales, most likes to talk about the units that are rebuilt, with a significant engineering contribution from the organization, almost beyond recognition, or push the state-of-the-art a little to provide "better-than-original" overall economy.

Under way since the late 1960s, GE's trademarked "Auto-Haul" program has been rebuilding suitable hulks of four-axle railroad switchers into radio-controlled units that in short-haul spotting, loading, or dumping assignments still develop the full tractive power associated with their 100-120 ton weight. These very efficient units require only the fuel and maintenance of a modern diesel engine supplying the 300 to 975 horsepower that provides the limited service speed required. Since from the frame up practically nothing but the sheet metal survives, and trucks, traction motors, and gearing are restored to good-as-new and guaranteed condition, ancestry of the hulk is of minor significance.

Repowering has been with Cummins or Caterpillar engines driving new or rebuilt GE industrial-switcher generators (5GT558 or 5GT603) already compatible with the 2,100 rpm of these high-speed diesels. GE engineering design of the all-important controls interfacing the customer specified radio control link (Vectran, FEMCO, or Telemotive) prime mover, and air brake systems with the rebuilt traction motors emphasizes reliability and serviceability in the individual application.

In the course of supplying more than 170 Auto-Hauls over a couple of decades, numerous modernizations in specific OEM and GE components have been incorporated as they have become available—others have not. On a considered basis, microprocessor-based controls of the type relied upon to keep high mileage GE road locomotives at the forefront in the fuel economy derby have not so far replaced the more traditional, relay-oriented high voltage cabinet circuitry. Though some of the relays themselves may now be solid state, the circuitry is easy to trouble shoot for an electrician who spends most of his time keeping other plant machinery in operation.

Gear unit common on many smaller industrial traction motors is adjusted after rebuild. Overhaul is done in-house by GE.

Far more important than gaining the last ounce of specific fuel consumption ratios in this low-mileage and often low-utilization service is the easy all-weather shut-down and start-up capability offered by the diesel package. While locomotive configuration and horsepower may be varied widely in matching service requirements, in such items as the all-new high voltage cabinet a considerable degree of standardization has been established.

• **Increasing tractive force.** Within the past year, the scope of Cleveland rebuilding has expanded in more than one direction.

—For Enterprise Coal, a full-size GE U30C road unit was repowered with a 600 hp Caterpillar 3412 engine driving a GE GT603 generator to power all six axles in a 188-ton locomotive. In this application the resulting tractive force does a job that would otherwise take two units, trading top-end speed for hauling capacity with an engine promising rock-bottom operating and maintenance costs.

—For Norfolk Southern, the Cleveland shop was the contract rebuilder for the second of two "production" TC-10 transfer units converted from GP9s in accordance with the railroad's design. Incorporating fuel-saving features like demand-matched, motor-driven auxiliaries to go with the microprocessor-regulated 1250-hp Caterpillar 3512 engine, its control system provides performance in line with that of the latest-generation road locomotives in every respect. The only exceptions are the speeds in the upper ranges that are not required in its service.

• **Greater horsepower, too.** Among the major market factors pushing the builders of all-weather, rugged diesels to develop higher-horsepower engines has been the desire of the off-highway equipment industry to build ever larger and more capable vehicles for overburden-removal and other mining servies. Even as truck capacity exceeds 200 tons, hauling can keep busy many more diesels than those represented by the number of locomotive units it may take to move the mine output to its destinations.

As the survivor of more abuse in a more uncomfortable environment and for more years than perhaps any other species of its size, the railroad traction motor represented a logical component around which to develop a smooth drive system rugged enough for reliable service. GE engineers at Erie have been active in this field for many years.

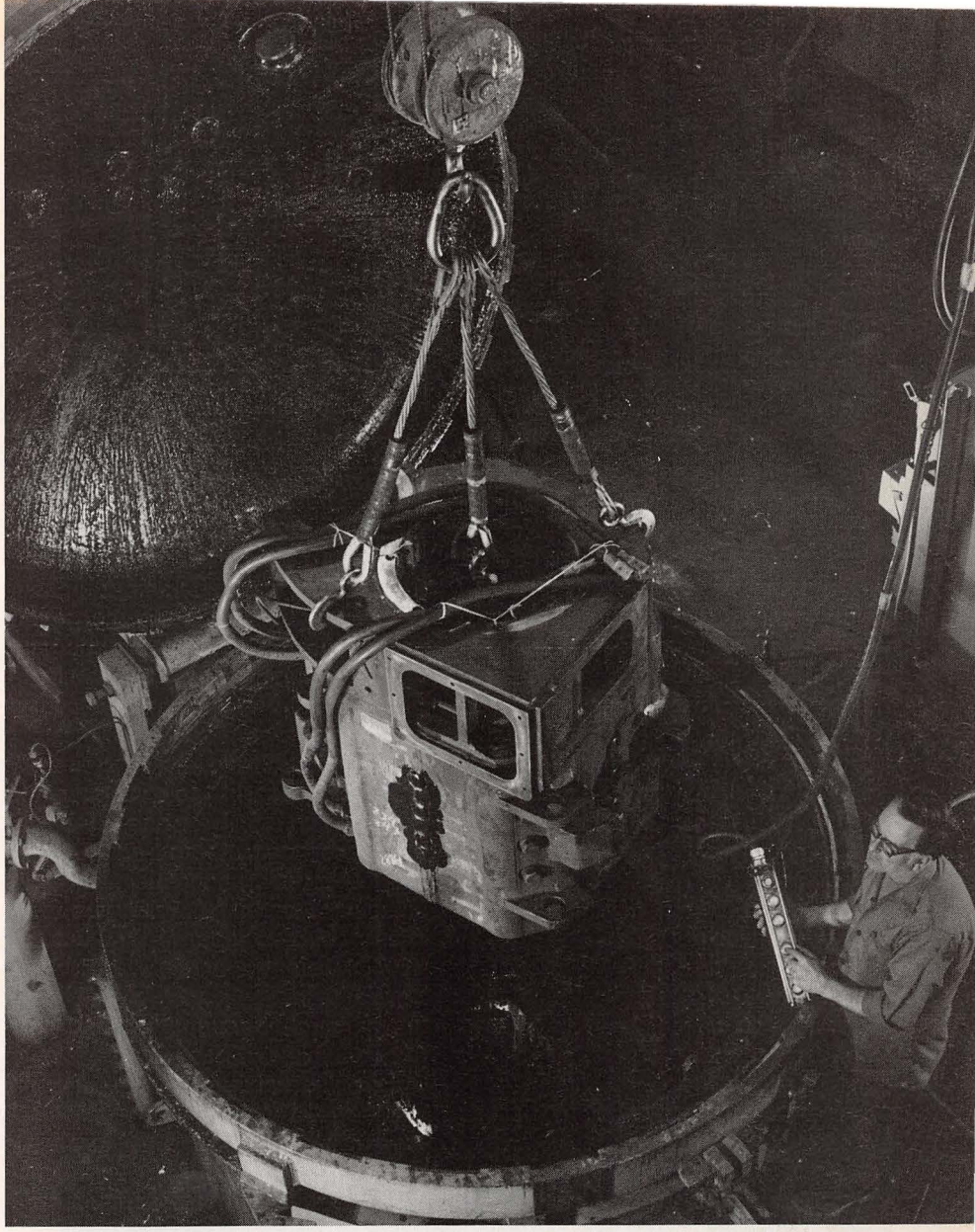
The result has been a "motorized-wheel" electric transmission based on dc locomotive control technology driving a machine internally similar to a standard traction motor—early on, the switcher-size 731 and later, as prime mover and tire capacity has increased toward 1,000 hp per wheel, the GE752. The planetary-geared unit, fitting neatly in the axle hub area, has demonstrated performance and endurance resulting in its adoption by several manufacturers despite a system cost, with generator and controls, that may amount to as much as a third of the whole vehicle.

• **Powerful and easy to maintain.** Bringing together several skeins of GE engineering experience, three locomotives built for Island Creek Coal for service in China in its joint-venture coal mining operation raised industrial locomotive weight and power to a new level. The prinicpal goals were tractive force to move 50-car cuts at moderate speed under all climatic extremes and minimum maintenance in an isolated location. In the same mining operation were 105 off-highway trucks powered with GE-Erie motorized-wheel drives, a significant plus for a locomotive with the same diesel engine and power alternator and common control componentry and philosophy.

The resulting locomotives were 153 ton six-axle U33C's with standard GE752 motors. To stay within axle load limits during shipment over the Chinese railways, the units had to be shipped stripped, to be ballasted to mine-trackage axle load limits on site providing the desired tractive force. The prime mover was a Cummins 12-cylinder, twin-turbo aftercooled, 2,100 rpm KTTA diesel, rated at 1800 hp and powering a GE GTA22 alternator. Full radio remote control of the locomotives, including some interlocks with the loading tipple sequencing, was provided.

In addition to the usual engineering and design interfacing between radio outputs, diesel, alternator and locomotive control circuits, GE engineers provided component interchangeability with other, non-locomotive equipment. They further utilized control voltages of 24 volts and 37 volts to allow the customer further component interchangeability. Bottom line: less spare parts and easier maintenance in a remote section of the world.

• **Lower costs.** Although rebuilding retains a significant role in programs to maintain motive power fleets that can move today's near-record tonnage, railroads of all sizes also appear to be retaining their long-standing reputation as champions in the "let's wait a while longer" game. In particular, there has yet to be a surge in orders from the regionals.

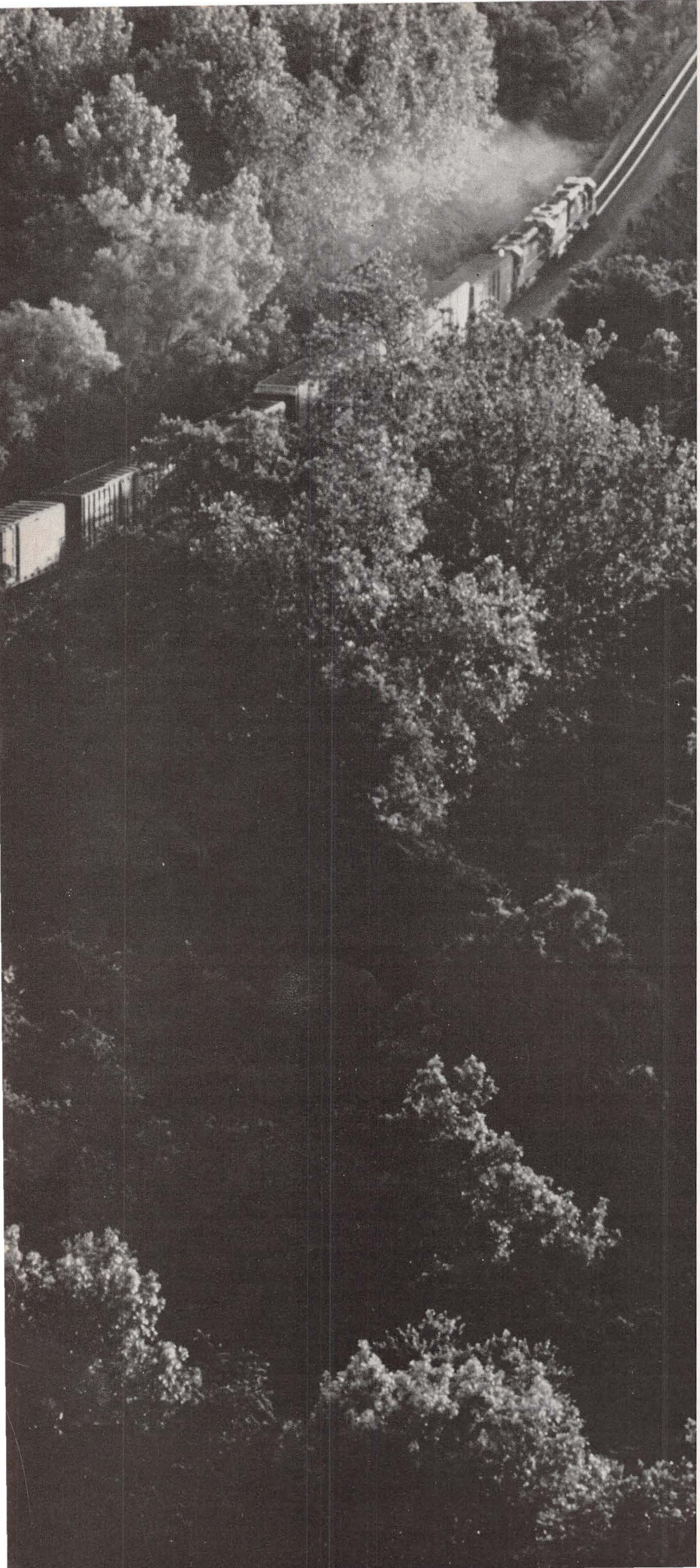


Frame of a traction motor is impregnated with solventless varnish for protection from dirt, moisture, and abrasion between coils.

Low as rebuild costs may remain in comparison with the purchase of new units (despite evidence of price stiffening in some component prices), a third-party financing is often as important to industrial users as to railroad customers. As one of the largest players in the game, GE Credit Corp. with its resources and transportation experience allows GE Cleveland to offer a complete deal within the family. To the Service Shop, net cost to the customer—hopefully, attractive enough to allow a program to proceed—remains the criterion for selection among alternative financial sources.

Craftsmen with extensive experience are employed on work such as wiring this AAR control stand.

On the technological side, however, there is no question as to GE Cleveland's readiness to take on a broadening spectrum of locomotive work, from overhaul and remanufacture into whatever more adventurous rebuildings, based on hardware and system design practice that has demonstrated its reliability under railroad service conditions, a customer's needs may suggest.■



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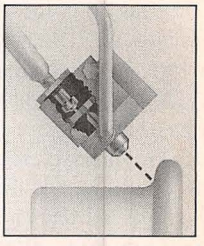

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Circle 59 on Reader Service Card

This Conrail test train played a pivotal role in establishing the real-world savings achievable with locomotive wheel-flange lubrication. In the consist were a Technical Services Laboratory research vehicle and 28 100-ton hopper cars loaded with ballast. Boston-line tests pointed to system-wide fuel savings averaging 7.3%

Rail lubrication: What's next?

By year-end, around 3,600 locomotives will have been equipped with flange lubricators. But while there's an ample supply of good hardware, the search goes on for the "ultimate grease."

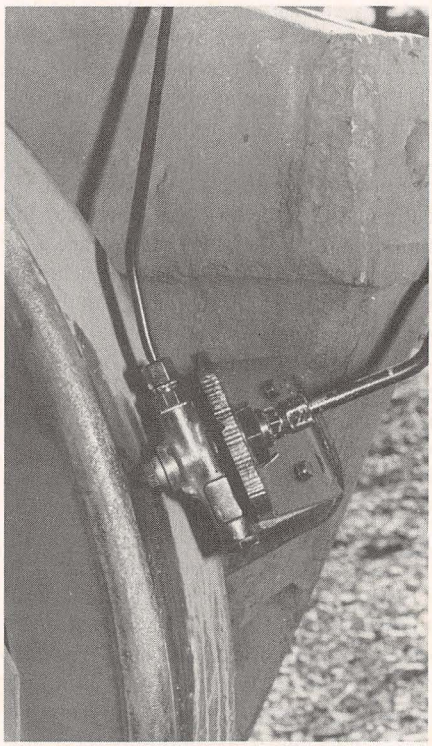
By LUTHER S. MILLER, Editor

The squirting of grease on locomotive wheel flanges to reduce rolling resistance is an inexact science still in its infancy. Nagging questions must still be answered before all affected departments on a railroad—operating, mechanical, maintenance-of-way—are thoroughly comfortable with the practice:

What is the optimum grease—one that will do the job but not overdo it? Will on-board lubricators eliminate or reduce the need for trackside curve lubricators? What are the long-term effects on rail wear?

But the bottom line is fuel savings, which is what wheel/rail lubrication is really all about, and enough unassailable answers are already on the table to make this one of the hottest technological developments to come down the pike since dieselization.

• **100%-plus return.** Exhaustive, real-world tests by Conrail (see box, p. 40) and Santa Fe point persistently, when all of the variables have been considered, to system-wide fuel savings averaging 7% or more. The implications are staggering for an industry that spends $1.5 billion a year for 3 billion gallons of diesel fuel, more than 90% of which is consumed in road freight operations. And because nobody really believes that diesel fuel is going to stay at its present low level of 50 cents a gallon, any means of reducing its consumption becomes all the more attractive.



Closeup of wheel flange lubricator mounted on a wheel of the locomotive of the Conrail lubrication test train.

The capital investment required to produce these savings is minuscule. On-board lubrication systems offered by half a dozen major suppliers—Madison-Kipp, Willy Vogel, Lubriquip, Bijur, TSM, and Unit/Fuji-Toyuki—come in at $4,000 to $6,000. The price depends partly on how many axles per locomotive are equipped with lubricating nozzles, and partly on the sophistication of the system: the options range from the mechanical to the microprocessor-controlled. (Also on the market are hi-rail mounted systems offered by Madison-Kipp and Fairmont.)

The lubricants themselves vary widely in price, from about $3,30 a gallon for the simplest, non-additive greases to around $7.00 for more complex formulations with, for example, graphite or molybdenum additives.

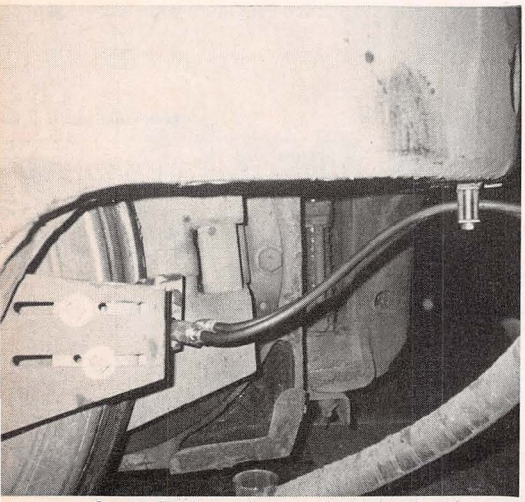
All of this adds up to an impressive return on investment: 100%-plus by Conrail's estimate. Some roads figure to recover their entire initial investment within nine months.

• **4,500 by 1990.** Railroads are racing to reap these benefits. A *Railway Age* survey last month indicated that close to 1,700 locomotives have so far been equipped with flange lubricators. By the end of this year that figure will have climbed to more than 3,600, and plans already in place will bring the total to more than 4,500 by 1990.

This is the current picture:

—Conrail has installed on-board lubricators, supplied by the pioneer West German manufacturer Willy Vogel, on over 600 main-line locomotives, for 85% coverage of its active road freight operations.

—Santa Fe plans to install TSM and Bijur lubricators on all of its even-numbered



Santa Fe has also conducted extensive on-board lubrication tests. Pictured is nozzle and bracket assembly of TSM lubricator on a Santa Fe locomotive.

units—about 600. As of January, 87 were in service.

—Burlington Northern has equipped 766 locomotives with Willy Vogel systems and is aiming for a total equipped fleet of 1,250 units by year-end. BN is now testing the TSM lubricator.

—CSX Transportation plans to install 1,200 Madison-Kipp lubricators over the next two years.

—Norfolk Southern has installed 65 Madison-Kipp systems and plans to equip an additional 144 locomotives at the rate of nine a week.

—Kansas City Southern has installed Fuji-Toyuki lubricators (marketed in this country by the Unit Co.) on 100 road freight units. (Twenty-five Fuji-Toyuki systems are being tested in the Soo Line and one on Denver & Rio Grande Western.)

—Union Pacific has been testing four TSM, four Madison-Kipp, and two Bijur lubricators and is expected to announce a program later this year.

—Southern Pacific will test 80 lubricators—20 each from Madison-Kipp, Lubriquip, Bijur, and TSM—and is expected to be in the market for 200 to 400 systems.

—Chicago & North Western is using a hi-rail mounted lubricating system with equipment supplied by Madison-Kipp.

A number of smaller U.S. roads, including short lines and regionals, have lubricators on test.

Meanwhile, interest has spilled across the border into Canada. CP Rail is testing 18 lubricators—nine Madison-Kipp and nine Bijur. CN is testing 12—four each from Willy Vogel, Madison-Kipp and Bijur. There's also offshore interest: Madison-Kipp has an order for 50 systems for India and has shipped test units to Australia.

• **Skeptics into believers.** It was just five years ago this spring that researchers at the AAR's Transportation Test Center at Pueblo, Col., stumbled upon a finding that led to the current spurt of activity—a finding of such potentially portentous magnitude that it was greeted with skepticism by many railroaders out in the rough and tough field of day-to-day operations.

In the course of an experiment measuring the effects of lubrication on rail wear rates for alloy and carbon steel materials, it was found that the test train—consisting of 70 100-ton cars traveling at a constant speed of 40 mph—was burning about 30% less fuel than identical trains rolling over unlubricated rail.

Events moved swiftly after that, culminating in the tests that convinced the most die-hard skeptics that average fuel savings in excess of 7% could be achieved by applying a thin film of grease to the rail via the locomotive wheel flange.

But the story is far from over. What at first seemed to be a low-tech development has raised some high-tech questions, and the search for answers continues.

• **Looking for a better grease.** What, for example, is the optimum lubricant? The jury is still out.

"The one feature that I have not seen satisfied is the need for a durable lubricant that can stand up through the passage of the entire trailing consist on a train," says Jack Stauffer, formerly director of Conrail's Technical Services Laboratory and now director of technical operations for the Transportation Test Center at Pueblo.

Conrail, which has been using a rela-

How Conrail checked

In a paper prepared for the Second International Symposium on Wheel/Rail Lubrication at Memphis, Tenn., last year, two Conrail officers—Dr. John M. Samuels, assistant vice president, industrial engineering, and Douglas B. Tharp, assistant director, Technical Services Laboratory—described the landmark tests that led Conrail to embark on a system-wide program of on-board lubrication. Some excerpts from that paper:

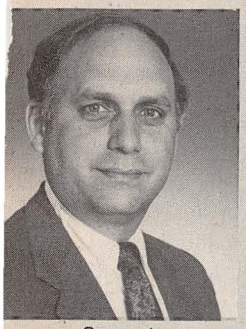
Conrail's Technical Services Laboratory conducted three series of tests in 1984 and 1985. These tests included revenue service testing in unit coal and piggyback trains as well as with a dedicated non-revenue train. Actual fuel savings are both route and equipment specific although analyses of data yields route classification characteristics which can be used to predict improvements for an entire system. . . .

In the spring of 1984, two Willy Vogel wheel flange lubrication systems were procured by Conrail. The available "timer" type control was replaced with a Conrail designed distance measuring control circuit to activate the lubricators. These two systems were installed on a General Motors Electro-Motive Division SD50 and SD40-2 locomotive. The spray nozzles were mounted to lubricate the leading axle of each locomotive regardless of operating direction. The locomotives were then instrumented by Conrail Technical Services Laboratory personnel to provide accurate measurement of fuel consumption and total power generated by the main alternators. Following pretest static fuel efficiency measurements to verify locomotive performance, the first over-the-road tests were conducted to determine if fuel savings could be detected in typical railroad service.

The test concept chosen was one in which aerodynamic influences would be minimized. Also, consistency of mechanical characteristics for the trailing tonnage was sought, along with accurate knowledge of total train weights.

A convenient test configuration was found to be readily available. Nine Pennsylvania Power & Light (PP&L) unit coal trains (nominally 130 cars each) operated from western Pennsylvania mines to a power plant just east of the Susquehanna River near Williamsport, Pa. Each of these trains operated every other day and did not exceed 40 mph. They also passed over a

out the Pueblo findings under real-world conditions


Samuels

Tharp

weigh-in-motion scale and could be expected to remain intact during a realistic test period. The 195-mile route was already lubricated by 44 pieces of wayside equipment due to a large number of ten-plus degree curves.

Arrangements were made to use one of these trains on a dedicated basis. Prior to beginning the test, precision measurements of the wheel flange thickness on several cars spaced throughout the consist were made and recorded. The measurements, made with modified dial calipers, were taken on four locations (one in each quadrant) at a fixed distance down from the apex of the wheel rim. Each set of future wear measurements was at the same exact location.

Three distinct test phases were then run. The first involved accurate measurement of the power required to overcome overall train resistance in the existing operation with all wayside lubricators operating. The second phase activated the on-board lubricators and attempted to measure any reduction in the power required to overcome train resistance. The third phase was to determine if the on-board lubricators could achieve a significant lubrication effect throughout the train length *without* the contribution of wayside lubricators. The results of all three phases were encouraging.

Based on the benefits observed in these tests, a second series of tests was requested. This series was conducted to determine the fuel savings that could be expected by using on-board locomotive wheel flange lubrication in high speed piggyback freight service. The trains chosen for testing operated between Newark, N.J., and Chicago, where track speeds of 70 mph are permitted west of Pittsburgh. Essentially, nine round trips were made during this series. Unavoidable variations in train configuration (consist) and speed profiles made the results of these tests statistically contestable.

To satisfactorily quantify the expected energy or fuel saving associated with on-board lubrication systems, a third series of tests was planned. In this series, a dedicated non-revenue train of 18 loaded 100-ton hopper cars was operated by a single locomotive between Albany, N.Y., and Framingham, Mass. Fourteen round trips were run at as nearly identical conditions as possible to establish an "unlubricated" (no on-board lubrication) baseline. The number of 14 individual runs was set by the experimental plan that determined statistically the necessary data precision needed to detect the expected small differences in power.

Following the completion of the first phase of this series, almost 70% of the locomotives in service on this portion of the railroad were equipped with on-board lubricators. A second phase was then run, after it had been determined that these locomotives were in fact applying lubricant and a steady state condition of lubrication existed on the rails. This was confirmed by several visits to sites along the route where wipe samples were taken from the rail to confirm the presence of grease. Following this second phase, the wayside lubricators were then disabled, and the test series repeated to see if the measured benefit could be attributed to, or achieved independently, by using "only" the on-board lubricators.

The results from tests on unit coal trains had been very encouraging. The data indicated, when compared to dry (unlubricated) rail, that fuel savings of between 25% and 35% could be achieved over the specific route. Data also showed that any results would be highly route specific. The tests indicated that 15% to 20% less fuel was required when the trackside oilers were operating alone, and 10% to 15% less fuel was consumed when the locomotive mounted lubricators were operated alone. By increasing both volume and frequency of grease applications during the on-board phases, it appeared possible to deposit sufficient grease with the two locomotive systems to lubricate the wheel flanges throughout the entire length of train. However, application rates of such magnitude are considered impractical, for revenue service installations, because the large quantities of grease will not adhere well to a wheel heated by severe braking. Nevertheless, wheel wear rates throughout the train were reduced.

The second series of tests, which had been run in piggyback trains to measure the benefit to be expected in Conrail's highest fuel usage locomotives, lacked a needed statistical reliability to detect the much lower percentage savings due to variations in train consists and speeds. Nevertheless, in all of the tests conducted by the Conrail Technical Services Laboratory the use of on-board lubrication produced an energy savings. This conclusion was reached regardless of problems encountered with lubrication rates, grease types, system reliability, crew variance, train weight differences, train type or geographical considerations. Based on these indications, a corporate decision was made to equip 120 road locomotives with on-board systems and enjoy the inherent fuel savings while a more precise series of tests could be conducted to improve the accuracy of the savings expectation.

The justification for this last test series was different from the first test in that the improvement in fuel efficiency was to be measured with the existing wayside lubricated condition as the baseline. Simply, it was tailored to answer, "How much fuel will be saved if we equipped the locomotive fleet with on-board lubricators?"

This was the plan for the Boston to Albany testing:

—Equip 40 locomotive units which run on the B&A between Selkirk, N.Y., and Framingham, Mass.

—Instrument a test train consisting of one SD50 locomotive (3,600 hp) and 18 open top hoppers loaded with ballast, Car 20, and caboose (1,936 trailing tons).

—Conduct three test sequences as follows:

Phase I—14 round trips with railroad lubricated by wayside units only—i.e. existing conditions.

Phase II—14 round trips with wayside lubricators on and flange lubricators on for all road freight locomotives.

Phase III—14 round trips with wayside lubricators off and flange lubricators on.

[Results of the Boston to Albany tests, extrapolated systemwide on the basis of prevailing terrain, led Conrail to conclude that fuel savings averaging 7.3% would be achieved by the installation of on-board lubricators on more than 600 locomotives with coverage of about 85% of its active road-freight operations.]

tively inexpensive, non-additive lubricant—Ossagol V—will begin field tests in March of a grease with a graphite additive. Similar tests are getting under way elsewhere.

Such field testing is, in Stauffer's view, essential. "New lubricants are on test both at Pueblo, on proprietary bases, and in many laboratories, but laboratory tests don't replicate the real world," he emphasizes. "In general the manufacturer does not have a way to test the same types of conditions that are imposed by railroad gauge face or wheel-flange lubrications. There are probably going to be several different lubricants that will become contestants for the ultimate grease."

What are railroads looking for in an "ultimate grease"? Douglas B. Tharp, assistant director of Conrail's Technical Services Laboratory, has drawn up the following list of characteristics of "a good wheel grease":

"1. Transferable by wiping from wheel to rail to maximize dispersal throughout the train.

"2. Sufficient tackiness [adhesiveness] to resist fling-off.

"3. Low viscosity change with a change in temperature to stay on a hot wheel and remain pumpable.

"4. Resistance to washing off by rain.

"5. Resistance to bleed, i.e. separation of soap or additives, due to pressure, temperature, and long periods of storage.

"6. Resistance to aeration during pumping action from the reservoir to the nozzle.

"7. Environmentally safe.

"8. Must have finely milled constituents to be compatible with the close tolerance of machined parts found in most dispensing nozzles.

"9. Cost effective to achieve maximum benefits.

"10. Distinguishable features to be able to determine from a test standpoint, the dispersal through the entire train."

Tharp notes that in recent years such additives as graphite, lead, molybdenum disulfide, and teflon have improved resistance to squeeze-out.

"There is no question," he says, "that the type of grease selected for any hardware is the 'secret ingredient' that will maximize the resulting savings."

Tharp says the feeling at Conrail is that "the grease currently being used with onboard lubrication does not persist throughout the length of a normal train. Therefore, we are not taking full advantage of the potential savings available. The use of the correct lubricant is the 'bottom line' in advancing this technology to the point that the entire industry can maximize the savings of energy, wheel wear, and rail wear."

- **How much lubricant?** Opinions vary as to how much grease should be applied. Dr. John M. Samuels, assistant vice president, industrial engineering, says Conrail has been taking "a very conservative approach."

"There is one thing," says Samuels, "that hangs over the head of all of us involved in flange lubrication, and that is, when do you get to the point where you have too much lubricant? Too much can mean applying too large a quantity, or too much can mean a lubricant that has the tenacity to stay for such a length of time that it builds up. Although you put a minor quantity on each time, it can build up to the point where it becomes too much. Then it rides up on the head of the rail, and you have a wheel-slip problem.

"We are lubricating with one set of lubricators on the front axle of each locomotive

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in the consist. And we are equipping only a percentage of our fleet with lubricators—some road freight trains will, in fact, run without lubricators. What we're talking about—and what's a little hard to grasp for many people who have worked for years with curve lubricators—is applying a very thin film of grease, thick enough only to cover the asperities of the contact surfaces. It is not dripping off the rail, if you will—in fact, you can't see it unless you take a paper towel and wipe the rail."

• Will curve lubricators survive? Long before the benefits of lubricating rail on tangent track were first perceived, railroads were using wayside lubricators to grease rail in such high-stress areas as curves. Wayside lubrication is a flourishing business, with systems supplied by several vendors—Rails Co., Moore & Steele, Portec, Abex, SRS, and Tamper. Conrail, for example, has 1,500 wayside lubricators on its 13,000-route-mile system.

Will on-board flange lubricators, most of which may now be equipped with curve sensors, eliminate the need for the wayside devices? The answer is probably not, except on curves of around four degrees or less (which many railroads do not in any case lubricate).

"From the investigations that have been done both by the AAR and independently by railroads, the possibility is slim that we will be able to totally eliminate wayside lubricators," says the Pueblo Test Center's Stauffer. "Perhaps the first reason for that is that wayside lubricators are friends of the maintenance of way department in that they reduce rail wear on curves, and they are site specific, which is something you can't say about the locomotive-mounted devices. And while there are ways of compensating for the amounts of grease that you can apply in a curve, I doubt if you can ever put out from an on-board device at the front end of a train sufficient grease to lubricate the wheels of cars back in the train through short-radius curves. We may well cut down on the numbers, but in my opinion we will never totally eliminate wayside lubricators."

The tank capacity of on-board devices is a major barrier to eliminating wayside lubricators. The tank for the Willy Vogel lubricator, for example, may carry around 50 gallons of lubricant. Applying .05 cubic centimeters per spray (one cc has 15 drops of lubricant), one tank can carry enough lubricant to last around 90 days. Meanwhile, a wayside lubricator may put out a pint to a pint and a half of lubricant per passing train. "On-board lubricators just can't put out that much," says Stauffer.

• Side effects. On-board lubrication is not without its side effects. What he calls "a nice side effect," though it's dwarfed by the savings produced by lower fuel consumption, is described by Conrail's Samuels: "We found that in locomotives running with flange lubricators, we literally eliminated thin flange as a reason for taking a locomotive wheel in for truing. We calculate that benefit to be $127,000 a year."

Conrail and other railroads are less certain about the long-term implications of lubrication in the areas of rail wear.

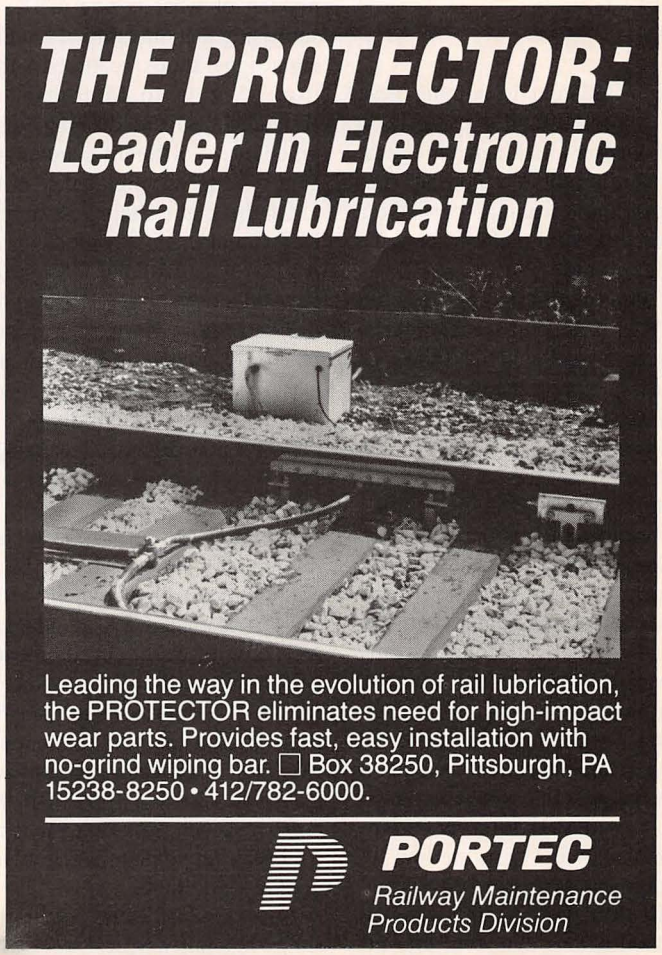
"If you don't get head wear," points out Tharp, "you may possibly get increased grinding requirements. You may have to grind your rail a lot more often in order to eliminate masking of rail failures."

The whole question of rail wear, notes Samuels, is "a very complex area. Lubrication plays a part. Wheel profile plays a part. Rail profile plays a part. Axle load distribution plays a part. Cleanliness of the rail when it was manufactured, hydrogen inclusions—they're all factors in how you get the most life out of rail.

"If you lubricate it and wear is minimized, what will happen then? Many people on the mechanical engineering side think that the rail will still have to be replaced in a reasonable time span due to defect generation in the rail rather than wear-out of the head. Some lubrication tests suggest that you can get 50% more wear out of your rail; but many people feel that before you reach that 50% of additional life you will run into internal defects caused by a buildup of stresses, the kind of defects your Sperry car will detect. So you would have to replace the rail before the head wears out.

"Lubrication will certainly extend the life of the rail head by cutting down on frictional abrasion that is caused by the asperities hitting one another in the wheel/rail interface. Can we as an industry take full benefit of that—and how big will the benefit be? That's a question that remains to be anwered on an operating railroad.

"In a laboratory we've proved that lubricating extends the life of rail. In a laboratory we've also proved that increased wheel loads create an environment where you have a higher propensity for transverse defects, due to stress buildup. What does all of that mean out in the real world? It remains to be seen." ■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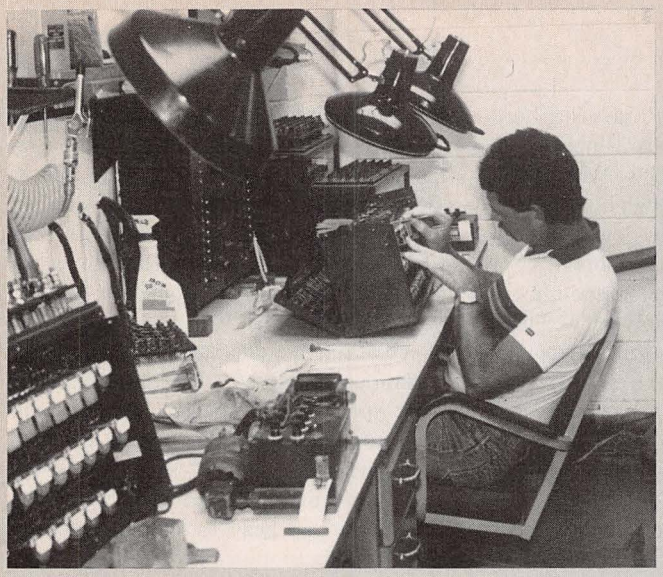
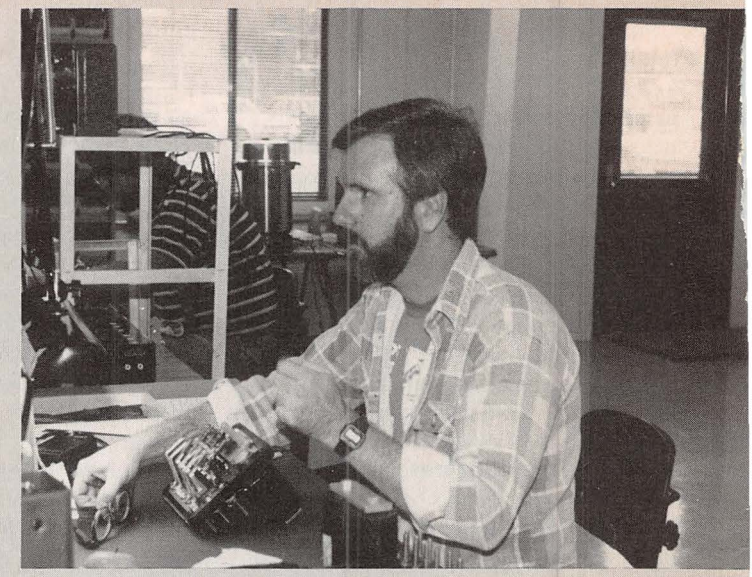




High worker morale and high productivity are hallmarks of CSX's new signal-repair shop at Savannah, Ga. Workers played an active role in designing the

For CSX at Savannah, a signal

CSX expects big returns from a relatively small investment—$800,000—in a consolidated signal-repair shop. It eliminates seven smaller shops and is designed to become a profit center.

By GUS WELTY,
Senior Editor

Shop consolidation is nothing new. Every major railroad is doing it, in just about every major area of operations. And there is probably nothing startling in the fact that a railroad can take a single shop location and make it serve the needs of a 22,000-mile system.

But there is something very different about CSX Rail Transport's consolidated signal shop at Savannah, and that's the high degree of participation in the design, planning, organizing, and scheduling of work by the work force itself.

That, however, is not the only thing that sets this shop apart. For example, with a work force currently standing at 66, everyone except shop manager Wallace Avin is a contract employee represented by the Brotherhood of Railroad Signalmen. For example, at a time when rail labor generally has deep concerns about contracting-out, the Savannah shop plans to be contracting-in, performing work not just for CSX but also for regional and short line railroads.

What CSX has now is a shop where morale is high, production rates are high, quality is excellent—and costs are low.

It wasn't that way until last fall.

• **Eight into one.** With all the rail mergers and consolidations that went into the making of what is now CSX, it was not surprising that the railroad found itself with eight signal shops, scattered across the map from Florida to Michigan. Inventory abounded. So did different methods and procedures, different standards, different controls and varying quality of work.

Of the eight shops, Savannah was the largest and there was room for expansion. And as a part of the CSX restructuring, Savannah became the location for the centralized shop, built at a cost of about $800,000, including modernization of the existing facility and construction of a new 10,000-square-foot building.

As it's now organized, the shop has three major work groups, each with a foreman—one group on wiring, one on relays and electronics, and one on reclamation.

Standards have been set, by employee-participation action councils with technical support from a CSX standards group in Jacksonville. Some developmental work on design details is still going on, but for the most part standards are in place on a system basis so that the best standards and practices from predecessor roads have been selected and so that (no small thing) shop employees will not have to keep referring to a lot of different plans and drawings as they get the work done.

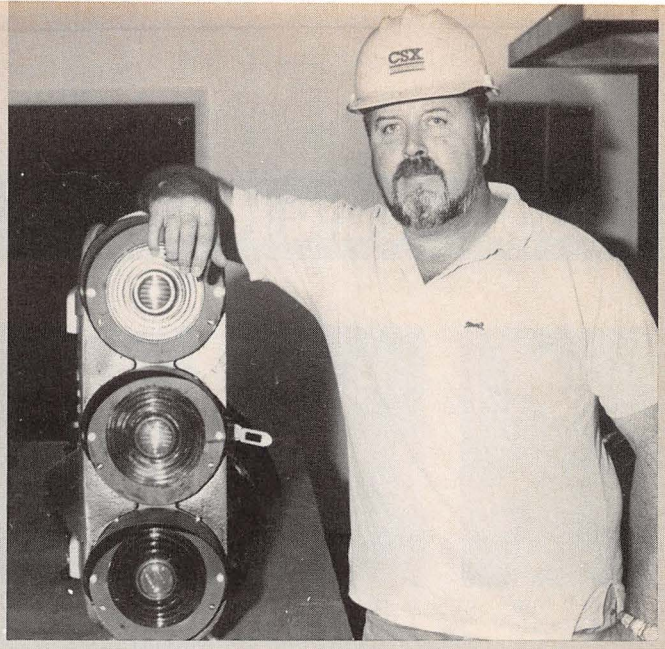
What kind of work comes through the shop? In a fairly typical week this year, the record showed work completed on 14 printed circuit boards, three motion detectors, 98 relays, 16 track overlays, four LCS units, four circuit controllers, three hand-throw switch electric locks, six power switch machines, 11 signal heads, two dwarf signals and 10 hydraulic retarder rams, plus the wiring of eight cases and houses and the wiring of two racks for the consolidated dispatching center CSX is building.

As for the work laid out for full-year 1988, that will include, on the major-item list, work on 150 power switch machines, 300 T21 hand-throw machine locks and 150 circuit controllers.

Obviously, on the cost side, there are savings to be gained from operating one modern shop instead of eight shops with a lot of years on them.

• **Saving by rebuilding.** But Savannah is also turning out repaired equipment at a fraction of the cost of buying new and with guarantees to match (or better) those that could be obtained on the outside. For example, CSX says, a power switch machine that might cost $12,000 new can be rebuilt at Savannah for about $1,600. Relays that would average about $750 new come out of the railroad shop at about $50, rebuilt.

CSX quotes similar spreads for other signal equipment. And savings also include what CSX people have been able to do in



new operation, but there's another reason for high morale: CSX plans to contract-in, rather than the reverse.

achievement

producing equipment to test the equipment that's being repaired.

As one example, consider equipment to test repaired relays to make sure that they're working properly. As Vice President-Engineering Glenn P. Michael puts it, "I feel sure that if we had put a group of managers to work on this, they would have come up with a very sophisticated test machine. Manufacturers offered us this equipment for about $11,000. Our people developed it for about $900."

CSX now has 20 of these relay test stands in the shop, says Chief Engineer-Train Control W. J. Scheerer, "all of them built in the shop by two people."

With the planned downsizing of the CSX rail system from what it is today to about 15,000 miles, there will be a flow of equipment into Savannah for reclamation, rehabilitation and repair.

There will also be a flow of signal components out of the shop to off-line points: CSX fully intends to go into the regional-railroad and short line market, and as of last month it was preparing bids in response to several requests for proposals.

CSX will still be buying new equipment, but it will be, as Bill Scheerer puts it, "state-of-the-art devices, items of new technology, such as, for example, electronic coded track circuits if we're putting in new ctc."

- **Then and now.** Glenn Michael looks back at what was, before the consolidation at Savannah, and at what is.

Before, he recalls, inventory "was just unbelievable." The railroad was buying new when it could have been refurbishing signal equipment, and there were those disturbing differences in the quality of shop output. Distribution of repaired equipment back out to the field was equally haphazard, and some of this lingered even after consolidation. Now, however, requests go through the purchasing pipeline and CSX has a far better grip on what's happening.

Glenn Michael and Bill Scheerer are especially proud, however, of the people involved. About two-thirds of the employees at Savannah moved from other locations, from Ocala, Fla., and Saginaw, Mich., and the five other points where signal shops existed. They made a commitment, making the move into a single shop that works under one labor agreement and with no guarantees except the one that Michael puts first: There will be a flow of material into the shop, he says, and a flow out of it to CSX and to other customers "and this is the best job security anybody can have, work and plenty of it."

And, while major rail facilities are seldom named for people other than former chief executives, CSX did a good piece in naming the Savannah shop the J. R. DePriest Signal Shop, after Roy DePriest whose railroad career began with Seaboard Air Line in 1932 and ended with his retirement as superintendent-communications and signals more than a decade ago.

At the dedication of the shop, Roy DePriest, at 76, observed that "most people don't have this happen to them while they can still see it." During his long career, he was sometimes controversial, and, he said, the naming of the shop for him "makes up for all the bad things people have ever said about me." As it happens, DePriest held a patent for a hotbox detector, a patent issued in 1965, five years after installation of his first detector unit. At the dedication ceremonies in Savannah, he recalled a couple of things. One was that "it seemed like forever" before a train with a hotbox ran past the detector, so he could be sure how the device would work.

Ronald W. Drucker, president and chief executive officer of CSX Rail Transport, and Glenn Michael also had a few things to say about what the shop is and about what's expected from it.

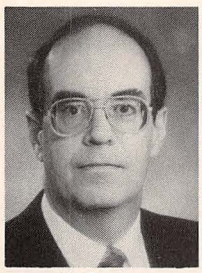
The DePriest Shop, Ron Drucker said, "will efficiently support the needs of our system because it incorporates the most modern production equipment and work methods available. The facility demonstrates, once again, our commitment to quality."

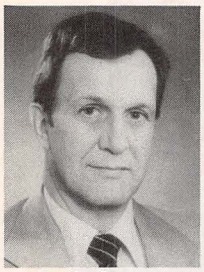
Drucker called the shop another new beginning for CSX, "a company that has pioneered new beginnings. But it's more than that, it's people," and he credited the BRS for helping in the design of a new kind of shop, one in which "people who work in the shop decide how to run the shop."

And as Glenn Michael put it, "We will have a better product, one that exceeds manufacturers' specifications."

From all aspects thus far, all the high hopes for Savannah were on target. ■

People in the News


K. F. Key
CP Rail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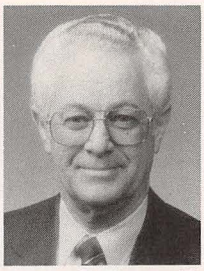
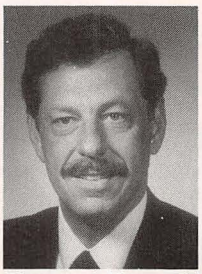

James R. Fitzgerald
Santa Fe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Michael R. Haverty
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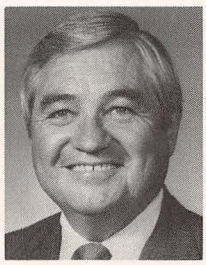
John A. Grygiel
Santa Fe


Joe E. Wark
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Patrick R. O'Brien
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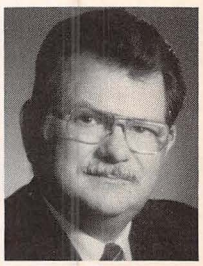
R. T. Thetford
Chrome Locomotive

CONRAIL.—Stuart M. Reed, president and chief operating officer, resigned Dec. 31.

Thomas A. Polidoro appointed director-intermodal sales.

Richard E. Flynn named director-customer support systems. **Lester M. Passa** appointed director-customer service.

CP RAIL.—K. F. Key named general manager, communications and public affairs. **B. C. Scott** appointed senior manager, communications and public affairs, system. Key and Scott are headquartered in Montreal. **J. A. Cox** named senior manager, communications and public affairs, Toronto and **J. D. Bower** appointed senior manager, communications and public affairs, Vancouver.

CSX TRANSPORTATION.—Priscilla N. Sims named resident vice president-state relations for South Carolina. **James W. Kittrell** becomes resident vice president-state relations for Georgia.

SANTA FE.—James R. Fitzgerald named senior vice president-operations; **Thomas J. Fitzgerald,** senior vice president-traffic; **Michael R. Haverty,** vice president-operations; **John A. Grygiel,** vice president-traffic; **Joe E. Wark,** vice president-business development, and **Patrick R. O'Brien,** vice president-marketing, all with headquarters in Chicago.

Robert E. Beard, director of marketing, Chicago, retired Dec. 31 after 38 years' service.

In the Mechanical Department, **Ron Berry** and **Keith Wolfe** appointed managers-special projects at Topeka and Chicago, respectively. **Richard T. Dennison** becomes assistant chief mechanical officer, Topeka. **Jerry J. Hodges** named assistant general manager-mechanical, Los Angeles.

Ronald B. Page named general superintendent of communications, Chicago, to succeed **H. L. Massie,** retired.

Suppliers

AMSTED Industries named **Gordon R. Lohman** executive vice president. **W. David Romoser** appointed vice president-general counsel and secretary.

Chrome Locomotive, Inc., appointed **R. T. Thetford** vice president-operations, Silvis, Ill. He was formerly vice president and chief mechanical officer, Illinois Central Gulf.

Morrison-Knudsen's Railroad Division named **Charles R. Wochele** Northeast sales manager-transit equipment, and **John A. Armstrong** Eastern area sales representative-locomotives and components.

Pullman Leasing Co. appointed **Robert M. Emanuelson** Eastern Regional sales representative, Philadelphia.

Railway Maintenance Equipment Co. appointed **Donald A. Himes** executive vice president.

RoadRailer named **George A. Ross** vice president-operations.

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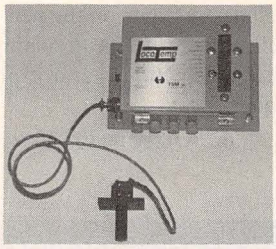
Circle 3 on Reader Service Card

Products Report

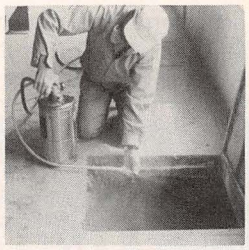
Locomotive fan controller



LocoTemp, introduced by Technical Service and Marketing, Inc. (TSM), is a solid-state locomotive cooling system fan controller which utilizes one temperature sensor to control the operation of all the cooling fans and ETS and is designed as a direct replacement for the mechanical, bimetallic switches which ordinarily perform the function. In addition to the reliability inherent in solid-state design, LocoTemp also incorporates a built-in fail-safe mechanism that will continue to protect the locomotive in the event of a temperature sensor or controller failure; either type of failure will cause a customer-specified number of fans to turn on and the ETS indicators to be activated. TSM says that since LocoTemp was introduced last fall, orders have been received from Union Pacific, Burlington Northern, Norfolk Southern, Southern Pacific, Grand Trunk, Florida East Coast, and Peaker Services, Inc.

Write in 970 on Reader Service Card

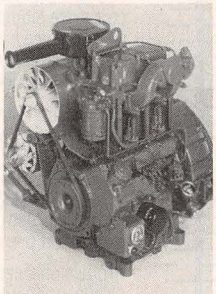
Insect-infestation eliminator



Insecto Products, Inc., is offering an EPA-approved dust—called INSECTO—which is said to have proved 100% effective in eliminating insect infestations in grain bins, silos, and railcars. The product is composed of two natural ingredients, a moisture absorbent and a bait. Approximately one pound is required for each 1,000 square feet of surface. It is claimed to destroy not only mature insects such as weevils, beetles, and moths, but also subsequent hatchings.

Write in 971 on Reader Service Card

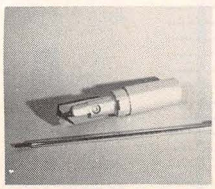
Diesel engines



Lister-Petter Inc. has introduced a two-cylinder diesel engine, the TX2, with a higher power-to-weight ratio and designed for a BHP range of 16.5 to 33.3. The company also plans to introduce a three-cylinder model, the TX3, which will be capable of power outputs of 24.7 to 49.9 BHP. Both units are designed for original-equipment as air compressors, pumps, generating sets, tower lights, welders and refrigeration units.

Write in 972 on Reader Service Card

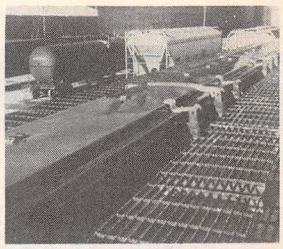
Drill bit and holder



NYTD Industries' Tracmaster™ System consists of the Tracmaster Holder, designed to fit all standard rail drilling machines, and the Tracmaster Bit, approximately one-half the size of a standard bit. The system is said to eliminate the need to reposition rail drilling machines for track bit changes as the holder is installed permanently and the bits are secured with a lightweight T-Handle Allen Wrench. Worn bits slide out with a turn of the screw. Bits are available in a wide range of sizes.

Write in 973 on Reader Service Card

Car roof renovation



Aero Transportation Products has developed a process that makes use of fiberglass-reinforced plastic laminates to renew damaged or leaking roofs on boxcars and covered hopper cars. In the Glass-Cap™ roof renovation, ATP removes all hardware and sandblasts the roof surface before applying the laminate directly to the old roof. ATP says the process results in a tough, smooth surface that is impervious to moisture, sunlight and most chemicals. The installation can be done at ATP facilities or at a customer's location.

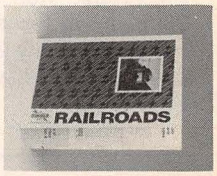
Write in 974 on Reader Service Card

Literature

EPA COMPLIANCE FINISHES. Available from the Haynes Division of Whittaker Coatings is product literature describing a complete line of high solids primers and topcoats for use on railcars and locomotives, including direct to metal alkyds, epoxy, and urethane coatings.

Write in 975 on Reader Service Card

RAILROAD LUBES. Sun Refining and Marketing Co. is offering a brochure describing railroad oils. Technical information is provided on paraffinic and treated naphthenic railroad base oils with all approved additive packages.



Write in 976 on Reader Service Card

HAZMAT HANDBOOK. The U.S. Department of Transportation has issued a new edition of its most widely distributed publication, its emergency-response guidebook dealing with transportation accidents involving hazardous materials. About 2.5 million copies of the 1980 and 1984 editions have been distributed, and DOT has printed 900,000 copies of the new guidebook.

Write in 977 on Reader Service Card

PNEUMATIC UNLOADING CAR. Trinity Industries, Inc., has issued a four-page, two-color brochure on the Power-Flo 15-psi pneumatic unloading covered hopper car. Included are full general arrangement drawings and detailed specifications on the car.

Write in 978 on Reader Service Card

Literature

CONCRETE REPAIR. Methods for repairing deteriorated concrete surfaces and structures are described in a 48-page guidebook from Structural Preservation Systems, Inc. The guide is divided into six sections—patching, grouting, cracks, joints, strengthening, and coatings—and describes repair procedures and applications for each. Diagrams and photographs are included.

Write in 979 on Reader Service Card

INDUSTRIAL COATINGS. Available from Rust-Oleum Corp. is a new catalog describing a complete line of industrial maintenance coatings. "RUST-OLEUM® Industrial Coating Systems" includes sections on the new Labor Saver™ line of coatings as well as updated data on coating economics, corrosion resistance, system selection, surface preparation, and application techniques.

Write in 980 on Reader Service Card

Classified

NOTICE TO OFFERORS
DALLAS AREA RAPID TRANSIT
RAIL TRANSIT VEHICLES

The Dallas Area Rapid Transit Authority is seeking to identify qualified transit vehicle manufacturers to provide technical, financing and cost proposals for the complete design, manufacture, qualification, pre-delivery and acceptance testing, delivery and post-delivery acceptance of Rail Transit Vehicles for the DART Rail Project.

DART will receive and evaluate proposals for supply of the vehicles under the negotiated procurement process. Accordingly, competition will not be limited to price alone. DART anticipates entering into a fixed-price contract with the selected manufacturer.

Transit vehicle manufacturers desiring to compete for award of this contract must submit in writing a Statement of Interest to H. McBeth, Contracts Department, Dallas Area Rapid Transit Authority, 601 Pacific Avenue, Suite 230, Dallas, Texas 75202 not later than 2:00 P.M. (CST) Friday, February 26, 1988. The formal Request for Proposal (RFP) is scheduled for announcement in early Spring, 1988.

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An excellent career opportunity for an aggressive individual who is railroad oriented, seeking advancement with a national railroad contractor. The position requires a minimum of 5 years mainline track rehabilitation experience. Please send resume and salary history in strict confidence to: Human Resources Manager, P.O. Box 85, McCordsville, IN 46055-0085.

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LS Transit Systems, Inc., a growing corporation, has immediate positions available for junior and senior track engineers. Send resume and salary history to: Personnel Manager, LS Transit Systems, Inc., 1515 Broad Street, Bloomfield, NJ 07003. An Equal Opportunity Employer.

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The Long Island Rail Road has an immediate opening in its Safety Department for a highly motivated Industrial Hygienist.

The professional we seek will be responsible for managing a corporate industrial hygiene program with primary emphasis on all workplace industrial hygiene environmental issues. Focus will be on chemical/toxic substance application and programs, occupational ergonomics, workplace assessments/analyses.

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Professional certification is desired. Persons applying must have strong oral and written communication skills and the ability to communicate with all levels of the corporate structure, union and governmental agencies representatives.

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100 YEARS AGO IN

(February 1888)

An electric railway 20 miles long is proposed to be built from Detroit to Mount Clements, a resort for invalids. The estimated cost of the road fully equipped is stated at $250,000, or $12,500 per mile. The longest electric road now in operation is thought to be that at St. Catharines, Ont., which is about seven miles in length. Whether or not electricity can be profitably employed as a motor for roads of any considerable length is a problem yet to be solved.

* * *

A dispatch from Mexico reports a case of "very unusual leniency" on the part of the Mexican authorities in dealing with train robbers. It is customary in that country to promptly shoot desperadoes who have been convicted of what is there considered the serious crime of stopping and plundering railway trains, instead of letting them run at large as is generally done in this country. But in the case referred to it is noted that the offenders in lieu of suffering the death penalty will be sentenced to hard labor for life, probably in mines belonging to the government. More "leniency" like this in the United States would be an improvement on the plan generally adopted.

* * *

Referring to two different routes under survey for the St. Louis & San Francisco railroad a Texas paper says: "As a matter of fact, we know that the 'ridge route' traverses about ninety miles between drinks as to either 'natural' or cheap water in its immediate vicinity." Ninety miles between drinks seems an awfully long while to Texans, who are accustomed to do their traveling on horseback, but when they realize that the railway would reduce the interval to two or three hours they may consider that the objection suggested is not fatal. In fact observation suggests that the construction of railways tends to reduce the distance between drinks to very much less than ninety miles, even in the most arid country.

* * *

The Pennsylvania railroad company requires about 60,000 tons of steel rails yearly for maintenance of road only and it has already given an order for 30,000 tons for the present year with the privilege of doubling it if desired. The price reported is $31.50 per ton.

* * *

The railways of the east as well as of the west have experienced great difficulty and delay this winter from snow blockades, the snowfall and storms in January having been unequalled for many years, causing in fact for a time almost total interruption of traffic. An officer of the New York Central estimates the cost to his company for extra expenses necessitated by a snow blockade at five or six thousand dollars per day, which suggests the enormous aggregate loss to the railways by this interference of the elements against which no skill or foresight can provide.

* * *

This is an age of stupendous schemes and the railway comes in for its due share. Prominent among these, in so far at least as the features of daring and magnitude are concerned, is the proposal to build a line of railway to connect Minneapolis and St. Paul with Pekin, China and Irkutsk, Russia, via Victoria, B.C., and Cape Prince of Wales, Behring Strait, involving among other astonishing things the bridging of Behring Strait, which at the point suggested in this scheme is only 35 miles wide and from 20 to 25 fathoms deep. The distance from Victoria to Cape Prince of Wales is about 1,100 miles. It is not stated who the moving spirits in this stupendous enterprise are further than that they are western men, which leaves no doubt that in the matter of enterprise and daring at least there will be nothing lacking.

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Modular design simplifies assembly of Viewliners

Maybe nobody is building intercity passenger cars in the U.S. today, but Amtrak has been busy *designing* cars almost since its inception. Amtrak's goal is a universal car—one that can run on all lines, be adapted to all types of service, and requires minimum maintenance. All that, and have maximum amenities for the passenger, too.

ROBERT G. LEWIS

During 1987, Transit America delivered three new stainless steel car bodies to Amtrak's specifications, prototypes for a new fleet—to be called Viewliners—meeting the more restrictive clearances of its lines east of the Mississippi where Superliner cars cannot be used.

The cars were delivered as shells; Amtrak had decided to tackle the outfitting of the cars to different configurations at its shops at Beech Grove, Ind.

Prior to placing the order, Amtrak's design department studied all the clearance diagrams that would apply to its operations in the East so as to maximize the dimensions of the car; hence a new shape evolved which is higher and wider than cars heretofore operated on these routes. The designers added nearly six full inches to the width—three inches on each side—simply by recessing handholds or mounting them parallel to the cars at openings.

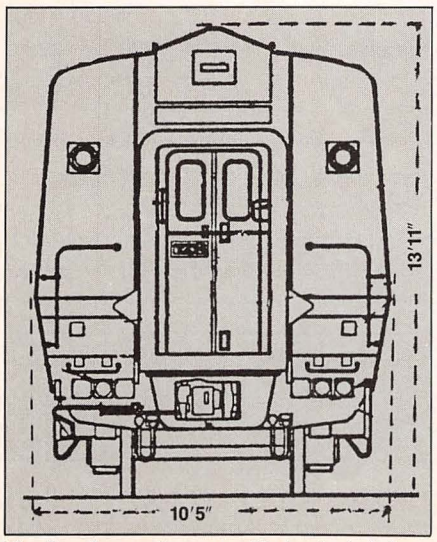
Since the cars are prototypes, and are to be road tested for at least a full year before production orders are placed, Amtrak decided to tackle the toughest designs first. Two cars were made into sleepers, a third into a diner.

Just about everything that is to go into the cars is modular, pre-assembled outside the car, to avoid the confusion and congestion of different crafts doing different work in the narrow confines of the car body during assembly.

Each car shell has a 7 foot by 8 foot plug door at the center on each side through which the interior modules are installed. The sleepers have three deluxe bedrooms and 14 compartments (for a total capacity of 34 passengers). Each is a separate module pre-assembled on the shop floor and loaded through the openings. The units are slid into position and secured to the floor. With the last unit in the car, the plug door, complete with its window, is bolted and semi-permanently closed with a waterproof sealant.

No two rooms actually touch. The space between them is filled with insulating material. With two fiberglass walls separated by the insulation-filled air space, they are so soundproofed that, as Ralph Dolinger, one of Amtrak's designers, puts it, "You could have a Boy Scout troop in the room next to yours and never know it."

The cars were designed to minimize road failures and reduce maintenance. The conduit for the 480-volt head-end power was previously mounted under the car body and vulnerable to damage from flying ballast or ice. The Viewliners carry the power cables from the between-car jumpers up both sides of the collision posts and across the top of the cars beneath the roof. Water is lifted pneumatically from under-car tanks to freeze-proof pipes in the hall ceiling conduit and down vertical service drops. Most services are thus readily accessible by removal of overhead panels inside the car body.



Viewliner has optimum profile for Amtrak lines east of Chicago.

The new cars are not high enough to permit bi-level design, so to make use of the ample overhead space a second row of windows is provided. Each upper sleeping accommodation has its own full window.

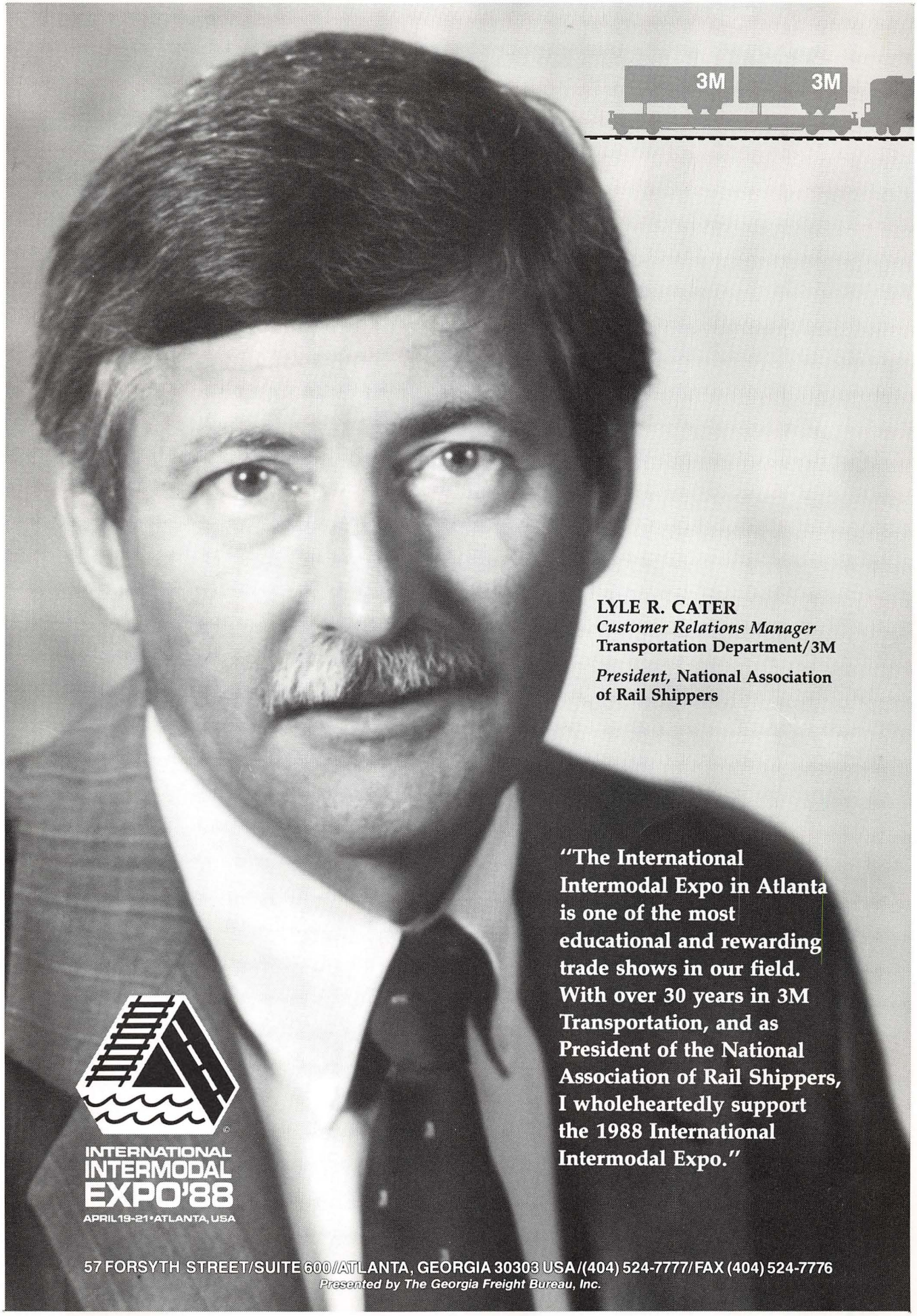
Each room has a toilet and sink. The deluxe rooms have showers.

The first sleeper was completed in late 1987 and made a round trip from Indianapolis to Houston via Chicago and New Orleans. The car earned high marks for riding quality and quiet operation. The test was run with Tokyu Car trucks. Several other trucks will be evaluated including Nippon Sharyo (Japan); CLRT (France); GSI Engineering and the Budd Co. (U.S.), and Dofasco (Canada).

The decibel rating inside the car at 75 mph, Dolinger reports, was just 64. That compares with a reading he measured in a Mercedes, at 60 mph, of 67 to 70. The only "bug" that developed was brownish water from the chilled drinking water tap in each room. That proved to be caused by an untreated elbow in the water line, and there are 17 in the car—one for each room—necessitating a time consuming retrofit when the car returned to Beech Grove. The purpose of the prototypes and extended road service is to find such defects and avoid costly retrofitting. The Superliner fleet in the 1970s underwent over 100 retrofits—that times 284 cars!

That is what Chairman W. Graham Claytor, Jr., is determined to avoid if Amtrak gets the go-ahead for its much needed equipment program. Several hundred cars are needed and plans call for about 100 a year. No matter who builds the car body, thanks to Amtrak's superb design work, not only Beech Grove but virtually any capable car shop can do the assembly.

When both of the sleepers are ready, they are to go into daily service on Amtrak's AutoTrain. Testing of the prototype diner is scheduled to follow shortly.



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Manageable track maintenance begins with reliable components. And that means Trackwork from Pettibone.

With more than a century of experience, Pettibone designs and builds Crossings, Frogs, Switches, accessories and components that last. You get quality trackwork that stays on the job year after year... without constant upkeep.

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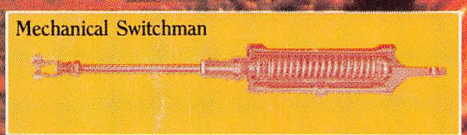

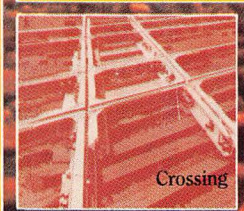

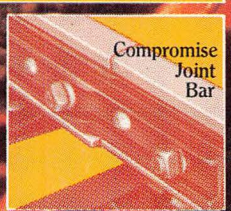

PETTIBONE

Pettibone Corporation
Railroad Products Group
Marketing Office:
5501 West Grand Avenue
Chicago, Illinois 60639
312-745-9364, 312-745-9496
Telex 25-3892

Manufacturing Plant:
Cleveland, Ohio
216-641-4000

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